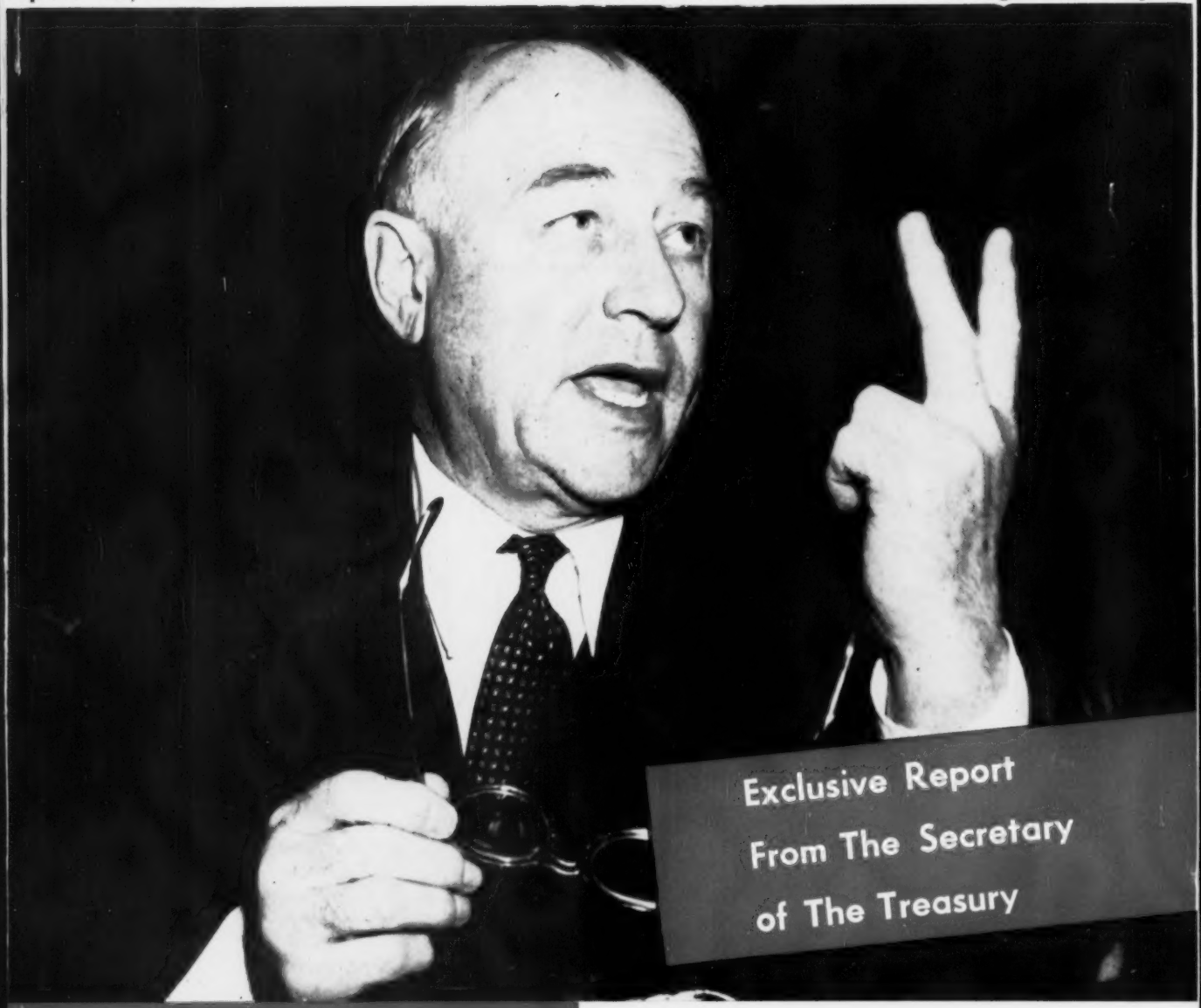
The IRON AGE

April 18, 1957

The National Metalworking Weekly



Exclusive Report From The Secretary of The Treasury

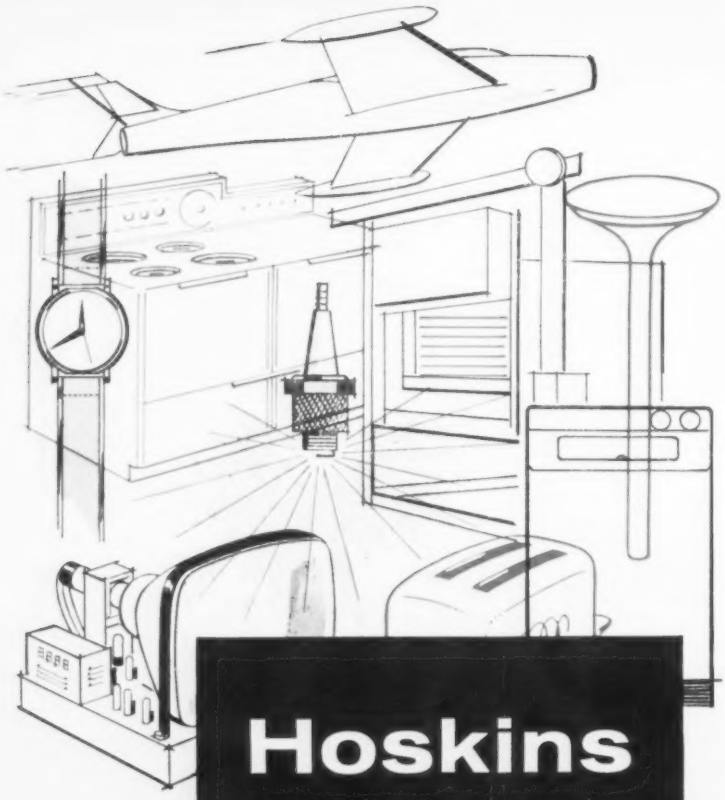
George M. Humphrey:

Why We Must Limit Fast Tax Write-Offs P. 67

Report on H-Iron: A Look at the Cost – P. 72

Resistance Welds Can Save on Short Runs – P. 107

Digest of the Week P. 2-3



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Alloys

CHROMEL-A is the original 80-20 nickel-chromium heating element alloy. Unequalled for durability and uniformity of resistance, it gives dependable top performance in electric ranges, furnaces and many other devices requiring heating units capable of operating at high temperatures under adverse conditions.

CHROMEL-ALUMEL thermocouple alloys possess finer accuracy and greater durability than any other known base metal materials. Made exclusively by Hoskins, they are the accepted standards for controlling heat treating operations up to 2300°F. and measuring exhaust temperatures of jet aircraft engines.

COPEL is a fine copper-nickel alloy which delivers superior performance on a wide range of "cold" resistor applications. Its controlled low coefficient of resistance, mechanical stability and high corrosion resistant properties recommend its use in precision instruments and many types of electronic devices.

ALLOY "502" is one of several special mechanical-purpose alloys developed and produced by Hoskins for diversified applications. Highly resistant to heat and corrosion, it is used with outstanding results as structural members for industrial furnaces, enameling hooks, heat treat fixtures, wire cloth, etc.

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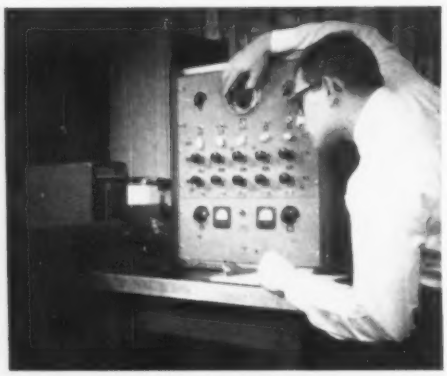
Serving the progressive needs of industry since 1908



Only one of its kind—Designed and built by Hoskins, this special instrument provides accurate means of measuring temperature coefficient of resistor wire and ribbon. As part of our complete metallurgical research and development facilities, it is one more reason why you should "look to Hoskins first for the finest in quality controlled alloys!"

DEVELOPING and producing custom quality alloys is a specialty at Hoskins. And it has been for nearly fifty years. Some, like Chromel, have been responsible for the birth and growth of entire industries. Others, like Copel, were developed to permit continued improvement in the design and operation of countless different end-products. Regardless of their application, however, each in its particular field is unsurpassed for durability, performance and dependability in service. And each is the result of specialized research activity devoted to the development of new and finer alloys to help make your products better.

Want more detailed information on Hoskins alloys, facilities and services? It's yours for the asking without obligation.

HOSKINS MANUFACTURING CO.

4445 Lawton Avenue • Detroit 8, Michigan

XX

This is the twentieth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Flame-Hardening Alloy Steels

When the surface of steel is subjected to direct application of flame and heated above the transformation range, then hardened by quenching, the process is known as flame-hardening. Its primary purpose is to surface-harden without affecting core properties. Jets of flame are played directly on the steel, and hardness penetration can be made to vary considerably. Usually in alloy steels this depth will range from 0.03 to 0.12 in., the actual figure depending upon the method of heating and quenching used.

Unlike carburizing, flame-hardening does not involve the absorption of extraneous elements by the steel. There is no alteration of the chemical composition. To put it simply, the steel must have its own self-hardening characteristics; cannot be dependent upon carbonaceous salt baths, gases, etc.

Flame-hardening is not a substitute for the conventional furnace method. Each has its uses. The particular virtue of flame-hardening is that the flames can be directed to localized areas. The furnace, on the other hand, is generally more economical and feasible when parts produced in large quantities must be hardened all over.

Any type of hardenable steel, alloy or carbon, can be flame-hardened, and there will usually be no scale or pitting. The alloy content is the governing factor when determining the quench. In some cases a rapid quench is required; in others, it can be as slow as air-cooling. Tempering presents no problems, for flame-hardened steel can be tempered as if hardened to the same point by other methods.

A list of typical flame-hardened parts would include such familiar items as gear and sprocket teeth, and certain types of cams and rollers, shoe treads, etc. This list is by no means exhaustive; it could include many other parts that often require a localized hardening treatment, especially for wear-resistance.

When seeking information about flame-hardening methods, please feel free to consult with our technical staff. Bethlehem metallurgists will gladly cooperate, and you can depend upon their suggestions. You can rely on Bethlehem, too, as a source of alloy steels, for Bethlehem makes the complete range of AISI standard grades, as well as special-analysis steels and all carbon grades.

If you would like reprints of this series of advertisements from No. I through No. XVI, please write to us, addressing your request to Publications Dept., Bethlehem Steel Company, Bethlehem, Pa. The first 16 subjects in the series are now available in a handy 32-page booklet, and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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THE IRON AGE
Chestnut and 56th Sts.
Philadelphia 39, Pa.
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Indexed in the Industrial Arts Index and the Engineering Index.

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THE IRON AGE, published every Thursday by CHILTON CO., Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. Price to the metal-working industries only, or to people actively engaged therein, $5 for 1 year; $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single copies 50¢. Annual Review Issue, $2.00. Cables, "Ironage," N. Y.

The IRON AGE

April 18, 1957—Vol. 179, No. 16

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NEWS DEVELOPMENTS

UAW Grants Special Status For Skills

Skilled workers will have special bargaining status. Move by UAW meets growing number of skilled, white collar and professional workers in plants it represents. It may be start of trend. **P. 71**

How Close is Commercial Production of H-Iron?

Low initial cost is one advantage of direct iron ore reduction plant over blast furnace installation, developer says. Semi-integrated specialty mills may be first to make commercial plunge. **P. 72**

Ore Industry Expects A Big Year

Lake Superior iron ore shipments may reach 77 million this year. A

surge of orders has firmed the market. Taconite and Jasper pellet producers expect a record. **P. 74**

Showdown Near in Chrysler Labor Hassle

Charges of "speedup" by UAW members are getting louder. One plant is out on strike, and two other locals have voted to go out. But

Metalworking

a companywide strike could be disastrous to Chrysler. **P. 84**

Trade Groups Face Tax Probe

The Internal Revenue Service is leaving few stones unturned in its search for tax evaders. Some "nonprofit" activities by trade groups may be inspected. **P. 89**

FEATURE ARTICLES

Eight Basic Resistance Welds Cut Short Run Costs

Can you redesign individual parts for short run assemblies—maybe make them from standard sheet and bar stock? This firm did; found 8 basic resistance welds would take care of all fastening requirements. Costs of the resistance-welded assemblies run 10-40 pct less than when arc-welded. **P. 107**

Where Betatron Inspection Fits In Metalworking

Betatrons are a bit rich for the average foundry's blood. But they do jobs other inspection tools can't do. Example: Fast, reliable inspection of thick metal sections. Use it to spot check, as a design tool, to get larger castings. **P. 111**

Paint Parts First, Machine Later

Prime and finish paint metal parts first. Then machine to size, ream and thread. That's what this firm's doing, using epoxy resin based paints. Finish resists perspiration, scratching, marring. **P. 114**

Hybrid Fastener Speeds Building Assembly

Building costs keep right on climbing. A new fastening method —utilizing a rivet-type fastener with some bolt - like characteristics— promises to cut erection time drastically on some jobs. An aluminum dome—48-pct x 152-ft diam—was put up in a record 20 hours. **P. 118**

Should Job Shop Platers Automate?

Productivity among job shop platers has jumped at least 25 pct in 10 years. Automation helps—even small shops now profitably plate 2 to 50 lb batches. This plater found automatic equipment upped production 330 pct, cut rejects down 80 pct. **P. 120**

MARKETS & PRICES

Road Program Spurs Steel Demand

Roadbuilders will need 1.7 million tons of structurals per year until 1960. They are also in the market for steel culvert pipe, guard rails, and other items. The biggest demand: wide flange shapes. **P. 75**

POWER TO TAX: Secretary of the Treasury George M. Humphrey explains the Administration's position in limiting fast tax write-offs for industry. At stake are tax cuts for special groups against a general reduction for all taxpayers. **P. 68**

Planned Packaging Returns Cost Savings

Plants that have re-engineered their packaging can return savings up to $500,000. Savings can come in lower shipping costs or added efficiency in handling. Standardized pallets are on the way. **P. 76**

Kaiser Expanding to Double Its Capacity

Firm's expansion program, set for 1958 windup, is going to cost $194 million. When it's completed Kaiser will be the largest steelmaker west of the Mississippi. **P. 90**

What's Best Machine Tool Replacement Guide?

Formulas aren't the best method for deciding when a machine tool is over the hill, says British expert. It's a problem requiring foresight and imagination on the part of the machine owner. **P. 92**

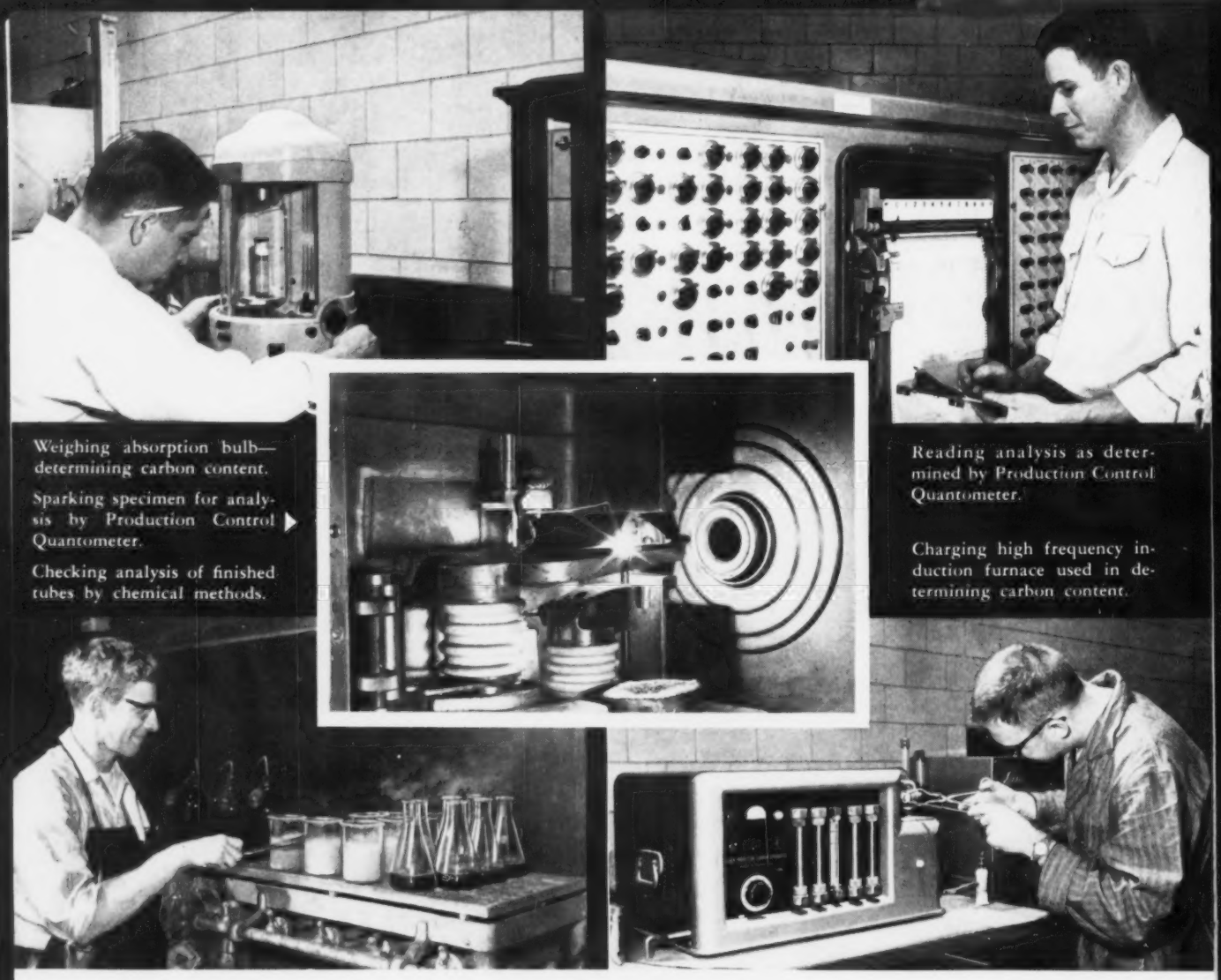
Steel Mills Are Reaching Out For Sales

Competition is forcing some mills to go beyond their normal market areas for orders. This means absorption of freight charges—and a lesser profit margin on sales. **P. 161**

NEXT WEEK

Foundries Go After Their Market

With record 1956 sales just a memory, foundries are sharpening their marketing tools for a real selling job. Next week's feature tells what some leading founders are doing to increase castings sales.



Weighing absorption bulb—determining carbon content.

Sparking specimen for analysis by Production Control Quantometer.

Checking analysis of finished tubes by chemical methods.

Reading analysis as determined by Production Control Quantometer.

Charging high frequency induction furnace used in determining carbon content.

THE O.K. YOU DO NOT SEE IS YOUR GUARANTEE

The key to the physical and mechanical characteristics of any steel lies in its analysis. Tensile strength, corrosion resistance, resistance to "creep" at elevated temperatures, reaction to heat treatment—to name a few—are largely determined by composition.

Through B&W's analytical laboratories pass the tubing destined for practically every known type of pressure or mechanical application—hundreds of different steels—each with its own particular characteristics—and checked by technicians who know their job and using the most advanced laboratory equipment available anywhere.

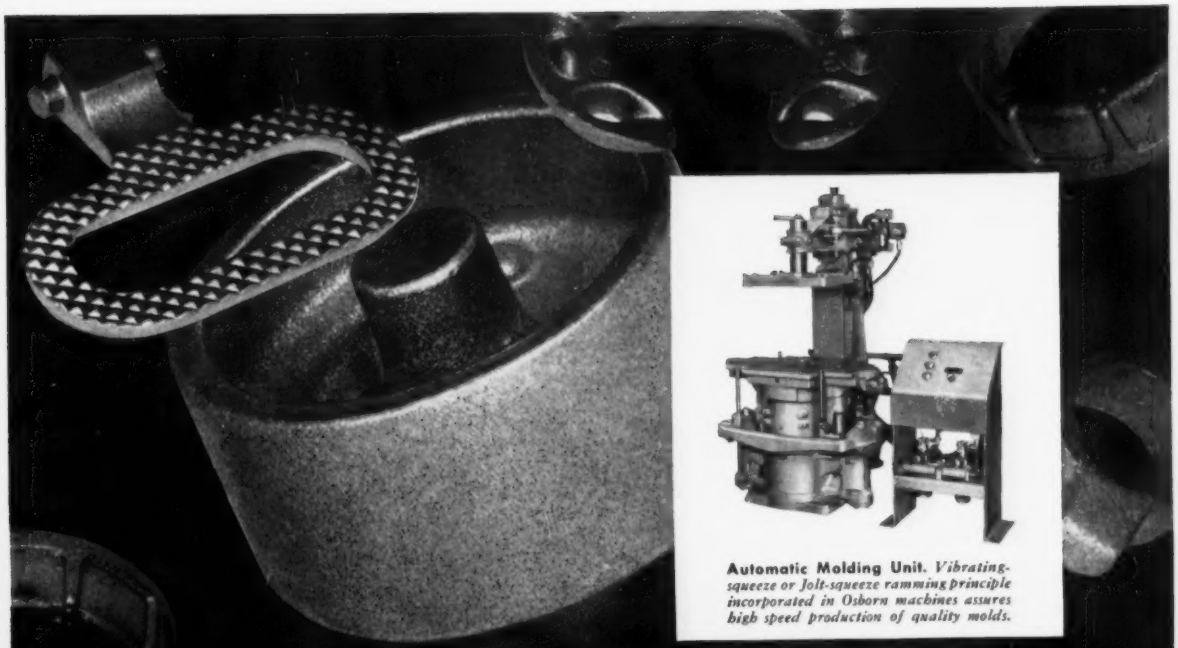
Modern control methods, plus years of experience help to make the B&W laboratory "O.K." the invisible hallmark of tubing quality—and is your assurance of ease of fabrication and good service. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

B&W

TUBULAR PRODUCTS DIVISION

TA-7019-G3

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels.



Automatic Molding Unit. *Vibrating-squeeze or Jolt-squeeze ramming principle incorporated in Osborn machines assures high speed production of quality molds.*

Automation in the foundry

...the strong right arm of quality control

UNIFORM products hour after hour flow from a production line automated with machines which think for themselves. Gone are the elements of human error . . . guesswork . . . decision.

Automation in the foundry also means faster production, lower costs, higher profits. With 45 years of research and manufacturing experience, Osborn has become the leader in foundry mechanization by furnishing a wide variety of machines for making molds and cores . . . machines recognized for their quality and dependability.

Learn about the newest advancements in automation for the foundry. Write *The Osborn Manufacturing Company, Dept. AA-16, Cleveland 14, Ohio.*

Leader in automation for the foundry

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

OSBORN®

MOLDING MACHINES
CORE BLOWERS
INDUSTRIAL BRUSHES
BRUSHING MACHINES

"Here's a hot one for the slitters

60,000 lbs. of slit coils . . . delivered early tomorrow!"

A TRUE STORY *of Ryerson service—the kind that makes Ryerson your best source for every steel requirement.*

It was ten after five. The phone rang and a steel buyer 80 miles away said: "I've simply got to have 60,000 lbs. of slit coils first thing in the morning."

Impossible?

Not at Ryerson. This kind of service is what Ryerson customers have learned to count on when emergencies arise.

The needed steel was on hand in Ryerson stocks. Unequalled slitting equipment was put to work. And during the night two different gauges of steel coils were slit to meet two size requirements. Early next morning the steel was delivered *as promised* . . . 80 miles away.

You don't have to wait for an emergency to appreciate Ryerson service. Our stocks and processing facilities enable us to meet practically every demand for steel—no matter what the shape, size, quantity or time requirement.

In addition, you can always depend on Ryerson for steel of high uniform quality.

So call your nearby Ryerson plant for steel or help on steel problems with the assurance of close personal attention by specialists who make your problems their own.

In stock: Carbon, alloy and stainless steel—bars, structural, plates, sheet and strip, tubing, re-bars—industrial plastics, machinery & tools, etc.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

A Cleaner House Is On Its Way In Labor

The Senate labor hearings have started a powerful catharsis in the citadels of labor. It is a question of who will clean house first: labor leaders or Congress.

Of course the shocking disclosures that pinpointed the head men in the Teamsters union will not destroy organized labor. But the bad smell will not blow over in a hurry.

The Teamsters have always had things pretty much their own way. AFL-CIO officials will have a tough time yanking Messrs. Beck and Hoffa into line. But the rank and file may help labor-chief George Meany to do this.

If some unions don't surround their pension funds and dues money—and their Bigwheels—with more rigid and public-minded controls, there is trouble ahead. Congress will see to that.

There are many unions which long ago adopted the same fiscal and accounting tools that are the rule in business. But others haven't. Some labor leaders must account to the members for their actions. But some need not.

Not too long ago the rank and file in the Steelworkers union almost upset the reelection of Dave McDonald over a "little" matter of higher dues. If such mild items can blow up such a storm in a big and well run union, what may the rank and file do in other unions in a crisis?

The "smart" money boys say the workers will take the Senate disclosures with a grain of salt and a shrug. Maybe so—and maybe not. The Senate would not have tackled such a hot subject unless the committee was sure of the rank and file's mood.

For years organized labor has been riding high. Wage increases have come every year like clockwork. Treasuries are loaded with money. Expenses have gone up and labor has become big business. Yet overall it hasn't the semblance of the controls over business.

Whether the Senate hearings will bring about tight controls over labor remains to be seen. Certainly Messrs. Meany, Reuther, Carey and McDonald are going to do everything they can to lighten the black eye Messrs. Beck and Hoffa gave to unions. The Teamster disclosures are not representative of all unions, but part of them will rub off onto labor as a whole.

The push for cleaner houses is on. It will last a long time. In the end labor will have to assume the same responsibilities that business does. It is big business using its power to get the biggest wages possible regardless of productivity or the state of the nation's economy.

Tom Campbell

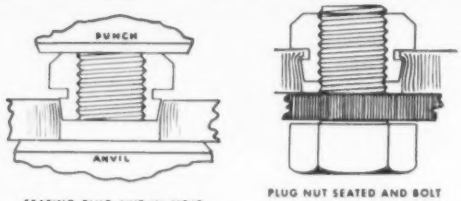
Editor-in-Chief

The Lamson Plug Nut has long been a favorite for assembling a wide variety of products. It is fast, efficient, inexpensive and can be hopper-fed on "automated" assembly lines.

Now Lamson & Sessions has improved this highly efficient, easy to use nut by knurling the portion that is inserted in the drilled or punched hole. This assures a tight, non-slip grip even in softer metals like copper, brass, magnesium and aluminum.

If you are still using or are planning to use awkward or expensive fastening methods, write for the whole story on Lamson Plug Nuts. You will discover a modern new way to save time and money on your assembly line!

Here's How Lamson Plug Nuts Work



SEATING PLUG NUT IN HOLE

PLUG NUT SEATED AND BOLT TIGHTENED DOWN

The nut is pressed into a punched or drilled hole of a predetermined diameter in ferrous or non-ferrous material. As the nut is inserted the material is compressed radially so that when the groove passes the top surface, the elasticity of the material will cause it to flow slightly into the groove, thus holding the nut in place.

Plug Nuts are made for use in any thickness of material down to .030" and in any tap size from No. 4 to $\frac{3}{4}$".

New Format

Sir—I heartily endorse THE IRON AGE's new type format. It's the greatest boon these aging eyes of mine have had in years!—J. C. Sears, Exec. Sec'y., American Gear Mfr's. Assoc., Washington, D. C.

Hard Sell

Sir—We are a subscriber to THE IRON AGE and regularly read and particularly enjoy your personal editorials. Quite often these editorials are clipped and sent around to other executives for their enlightenment and comments.

Would you have any serious objection to our occasionally publishing in our company magazine an editorial such as the Mar. 21, entitled "There's No Sell Like the Hard Sell?" We would, of course, give you and THE IRON AGE due credit.

Congratulations on your ability to write such inspiring and helpful messages which must certainly benefit thousands of readers the same as it does me.—R. G. Ayers, Vice-Pres. and Gen. Mgr., The Bovaird Supply Co., Tulsa, Okla.

▪ Yes, you do have our permission.—Ed.

Scrap Control

Sir—Please send me two reprints of your article "Guide To Better Scrap Control" on p. 85-88 of your Mar. 28 issue.

I think your magazine is doing a fine job for the metalworking industry. Articles of above nature I know are of great interest to all of us. Let's have more of them.—A. W. Tyson, General Electric Co., Louisville, Ky.

Piano Plate

Sir—As you can see by my letterhead I am in the retail piano business. The "plate" or "harp" of a piano is usually cast iron. We are handling a piano from England which is reputed to use a semi-steel plate.

We recently have run across a proprietary name Meehanite for a formula of semi-steel. Will you please advise me who are the owners of the trade name Meehanite so that I can carry my inquiries further?—P. Kegley, Palo Alto, Calif.

▪ Write to Meehanite Metal Corp., 714 North Ave., New Rochelle, N. Y.—Ed.

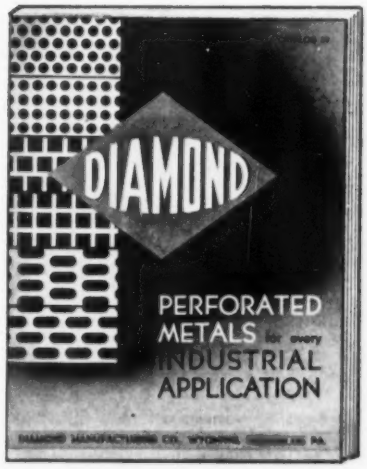
Open Letter

Sir—We should like to request permission to reproduce Clarence F. Smart's "Open Letter to Car Engineers" (Feb. 28, p. 11) in the Air Scoop, our Utica Div. house organ.

We feel that you and your staff do an excellent job, and find this publication to be very helpful. Our copy is circulated within the department and later the feature articles are sent to various supervisors as tearsheets and then filed. —D. L. Palmer, Methods Engr., Bendix Aviation Corp., Utica, N. Y.

▪ Permission granted.—Ed.

"My boss and I have a broker—only his is a stock and mine is a pawn."



This 32-Page Catalog Points the Way to Improved Design of Many Modern Products

Diamond Perforated Metal is an important factor in the design and construction of more products that enter into every-day life than most people realize.

In Space Heaters, for example, in Air Conditioners, Television Sets, Diffused Lighting Fixtures, the Ornamental Enclosures which conceal your radiators, the Spinner Basket of your washing machine, the Screens which help prepare the coal you burn and the food you eat.

Industrial applications cover an even wider range—from Machinery Guard and Sound Control Equipment to Stainless Steel Screens for oil refineries and synthetic rubber plants. New applications are developing every day as we keep in step with the requirements of engineers, chemists and industrial designers.

Catalog 39 shows many modern applications; gives all the illustrations and working data you need to plan ahead. Write, today, for a free copy and tell us about ANY requirement for perforated metal. We are equipped to fabricate complete parts, if desired, and our engineers welcome opportunities to make money-saving suggestions.

DIAMOND MANUFACTURING CO.
Box 41 WYOMING PENNA.
(Wilkes-Barre Area)

West Coast Plant, Diamond Perforated Metals Co. 17915 So. Figueroa St., Gardena, Calif. Los Angeles Area

BAKER announces an ALL NEW PNEUMATIC-TIRED FORK TRUCK

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Double-yoke construction for extra strength. Longitudinal mounting in jumbo rubber blocks to provide lateral oscillation and absorb ground shocks.
Power Unit
Heavy-duty industrial gas engine with extra stamina for continuous rugged service. Features maximum fuel economy—minimum maintenance.
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Power Steering
Standard at no extra cost. Effortless full-time power steering means less operator fatigue, greater safety and more work per day.
Lift and Tilt Controls
Conveniently located and easily manipulated levers for positive control of hydraulically-operated hoist and tilt motions.
Drive Axle & Transmission
Rugged Timken industrial truck axle and heavy-duty transmission, with two speeds, forward and reverse.
Single or Dual Wheels
Large pneumatic tires on drive wheels, with deep treads for maximum traction. Dual wheels available for extra heavy duty, better flotation and added stability.
Brakes—Hydraulic self-energizing, full-floating type—in drive wheels. Self energizing in both forward and reverse. Duo-grip, two-shoe independent parking brake on transmission shaft.

This Baker FGF-40, 4,000-lb. YARDLOADER, first in the new line of Baker pneumatic-tired gas fork trucks, has many new design features for greater maneuverability and more dependable performance. It is *fast*—top speed with load, 8.6 mph. It is *compact*—only 48 inch wheelbase, and minimum overhang—*and only 79 inch turning radius.* Low center of gravity makes this possible without sacrificing stability.

Absence of cowl provides maximum visibility. Power brakes and many other driver conveniences make it one of the easiest handling fork trucks—and one of the safest. Full 130-inch lift, with single or dual cylinder. Truck-loading mast available with 110-inch lift and 71-inch overall height . . . For complete information ask for Bulletin 1382.

Baker® industrial trucks

THE BAKER-RAULANG COMPANY

1227 WEST 80th STREET • CLEVELAND 2, OHIO

A Subsidiary of Otis Elevator Company

FATIGUE CRACKS

Hard-Money Man

George Humphrey, our tough-minded Secretary of the Treasury, is not one to pull his punches. He's a hard-money supporter, a believer in a sound economy and a conservative in the good old-fashioned meaning of the word. And he doesn't hesitate to let people know it.

In his exclusive IRON AGE article this week (p. 67) he presents his views on fast write-offs and depreciation policies. In a nutshell, he feels that the fast tax amortization program should be limited strictly to special-purpose defense items.

Realistic Approach—He is aware of the problems industry faces in obtaining capital for replacing plants and equipment. But he is

realistic enough to see that there are still many complex problems to solve before depreciation methods can be revised. And he admits that as yet he sees no satisfactory answers.

His views have the benefit of his being on both sides of the government-industry fence. Before entering the cabinet he was well-known in the iron and steel industry as president of M. A. Hanna Co. A lawyer by training, he spent most of his business career in the iron and steel industry before entering public life.

Good Record—His record for integrity and single-mindedness, resulted in a call for his talents by earlier administrations as well as the present one. Little known, but appreciated in government circles, were his confidential reports on the dismantling of Germany after World War II. His recommendations later became policy. He is better known for being in the thick of the fight for the St. Lawrence Seaway.

It's unlikely that anyone who writes on fast tax write-offs and depreciation policies will find universal agreement among the readers. But you'll have to admit that in this week's article he lays his feelings . . . and judgment . . . on the line.

Puzzlers

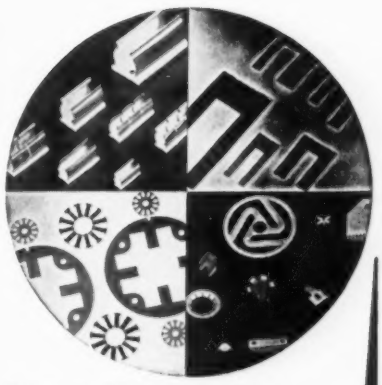
Oh, men! Oh, women! Regarding the puzzler of March 28, the man received no letter because the key to his mail box was locked inside the mail box as a result of having mailed the key to his wife. Winners: Jim Mull, The North American Manufacturing Co.; Edward Bell, Springfield Gas Light Co.; Suzanne Ogden, Westinghouse Electric Co.; Norma J. Schweig, University City, Mo.; William Moss, Chicago; D. M. Ertner, Western Electrical Co.; Frank Wielgorecki, Electro-Motive Div., GM; C. Leonard Forbes, Wilfley Centrifugal Pumps; Wilbur L. Baker; R. W. Sweitzer, Grace Chemical Co.; Marlene Mincoff, Allis-Chalmers, Milwaukee; The Folks at General Steel Castings; and Richard Larregui, Carmella and Nancy Pinella, New York Naval Shipyard.

Wacky Mottoes

STOP AND THINK

THERE MUST BE A HARDER WAY

Thanks to M. R. Bowerman, Director of Research, The Alliance Machine Co., Alliance, O.



Can 0.0005 inch precision strip simplify your product design?

From 0.0005 in. to 0.040 in. thick and 0.090 to 6 in. wide, these alloys are available as special-tolerance strip:

Beryllium Copper
Phosphor Bronze
Nickel Silver
Brass
Chromium Copper
Stainless 17-7PH
Invar
Magnetic: High Nickel

Some immediately available. Others rolled to order in 2 to 21 days. Can be supplied in coils or straight lengths with slit or filed edges—also cadmium plated.

Write for Bulletin 7 TODAY.

PENN
PRECISION PRODUCTS, INC.
501 Crescent Avenue • Reading, Pa.

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New York — H. G. WILLIAMS, Ramsey, N. J.
Philadelphia — J. A. RHODES, Bala-Cynwyd, Pa.
Boston — F. G. STROKE, Wellesley, Mass.
St. Louis — J. A. CROWE
Cleveland — L. D. ALSPACH
Chicago — R. A. BURKETT, Franklin Park, Ill.
Houston — RANDOLPH SALES CO.
Los Angeles — KRUSEN WIRE & STEEL CO.

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New York — BERYLLIUM COPPER SUPPLY CO., Little Falls, New Jersey
Chicago — PENN PRECISION PRODUCTS, INC., Franklin Park, Ill.
Los Angeles — KRUSEN WIRE & STEEL CO.

Foremen Rousseau and Burns with abrasive engineer Pete Wilson developed a radically new "spec" for these extra-hard metals.

A GRINDING PROGRESS REPORT

Extra Fine Grit Silicon Carbide Succeeds In Tough Vasco Supreme I. D. Grinding Job.

Finer grits and "softer" wheels are the usual approach to grinding hard metals. This was not enough, however, on the hardened die steels required at the W. H. Nichols Co., Waltham, Mass. Wheels soft enough to cut, with the limited pressure of internal grinding, were too soft to hold shape.

Recommended: Silicon Carbide grain, for better penetration into these metals of high carbide content, and grits much finer than the normal 90, to take smaller chips but more of them.

Results: Using 240 grit on the Vasco Supreme, and 150 on the Neatro and Ohio Air Die steels brought about both the quality and quantity of production desired. With wheel dressing reduced to 1/8 the amount formerly required, 50 or more pieces are now completed per wheel.

These results are typical of Bay State. You can get them through your local distributor, any branch office, or the Bay State Abrasive Products Co., Westboro, Massachusetts.

Branch offices are located in Bristol, Conn., Chicago, Ill., Cleveland, Ohio, Detroit, Mich., Pittsburgh, Pa., with distributors in all principal cities.

Slender spindle and large contact area limit infeed pressure, making wheel selection critical on hard, abrasion resistant metals.

BAY STATE®
WHEELS of PROGRESS

YOU CAN SAVE TIME, TROUBLE AND COSTS with

Formed Tubes...

★ **Save Time**

We have a huge stock of dies and, when needed, tooling's fast. We also avoid delays by making our own electrically welded steel tubing, sizes from ⅝″ to 3″ OD.

★ **Save Trouble**

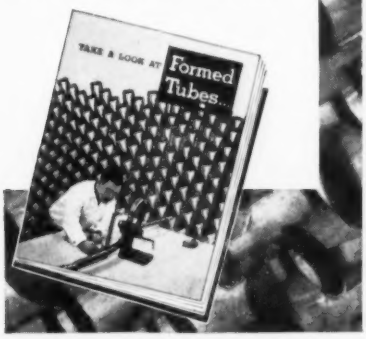
Long, active experience with all tube forming processes and high standards of quality control make sure your orders will be completed *right.*

★ **Save Costs**

It's routine for formed tubes parts to deliver top performance, save weight, cut costs. Steel, copper, brass, aluminum or stainless tubing fabricated in ⅜″ OD to 6″ OD sizes; from 20 to 11 ga. metal.

Formed Tubes, Inc.
406 Prairie, Sturgis, Michigan

Write for FREE Booklet



EXHIBITS, MEETINGS

Engineered Castings Show — May 6-10, Cincinnati. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.).

Design Engineering Show — May 20-23, New York. (Clapp & Poliak, 341 Madison Ave., N. Y. 17).

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22).

Metal Show — Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3).

APRIL

American Institute of Electrical Engineers—Biennial conference on electric heating, Apr. 23-24, Commodore Perry Hotel, Toledo, O. Society headquarters, 33 W. 39th St., New York.

Steel Shipping Containers Institute —Annual meeting, Apr. 23-26, Palm Beach Biltmore Hotel, Palm Beach, Fla. Society headquarters, 600 Fifth Ave., New York.

Copper and Brass Warehouse Assn. —Meeting, Apr. 24-27, Hollywood Beach Hotel, Hollywood, Fla. Society headquarters, Investment Bldg., N. W., Washington, D. C.

SAM - ASME — Twelfth annual management engineering conference, Apr. 25-26, Hotel Statler, New York. Society headquarters, 74 Fifth Ave., New York.

American Zinc Institute — Annual meeting, Apr. 25-26, Drake Hotel, Chicago. Society headquarters, 60 E. 42nd St., New York.

Institute of Environmental Engineers—First annual technical meeting on environmental testing, science and simulation, Apr. 25-26, La Salle Hotel, Chicago. Society

Continued on P. 16

A COMPLETE REFRACTORIES SERVICE...

for the Steel Industry

OLIVE HILL BF and OLIVE HILL HI-FIRED brick rank high in any list of prominent and widely used brands of blast furnace refractories. Manufactured from dense-burning Kentucky flint fire clays by Grefco's unique manufacturing processes, OLIVE HILL brick set a standard for blast furnace refractory quality and workmanship.

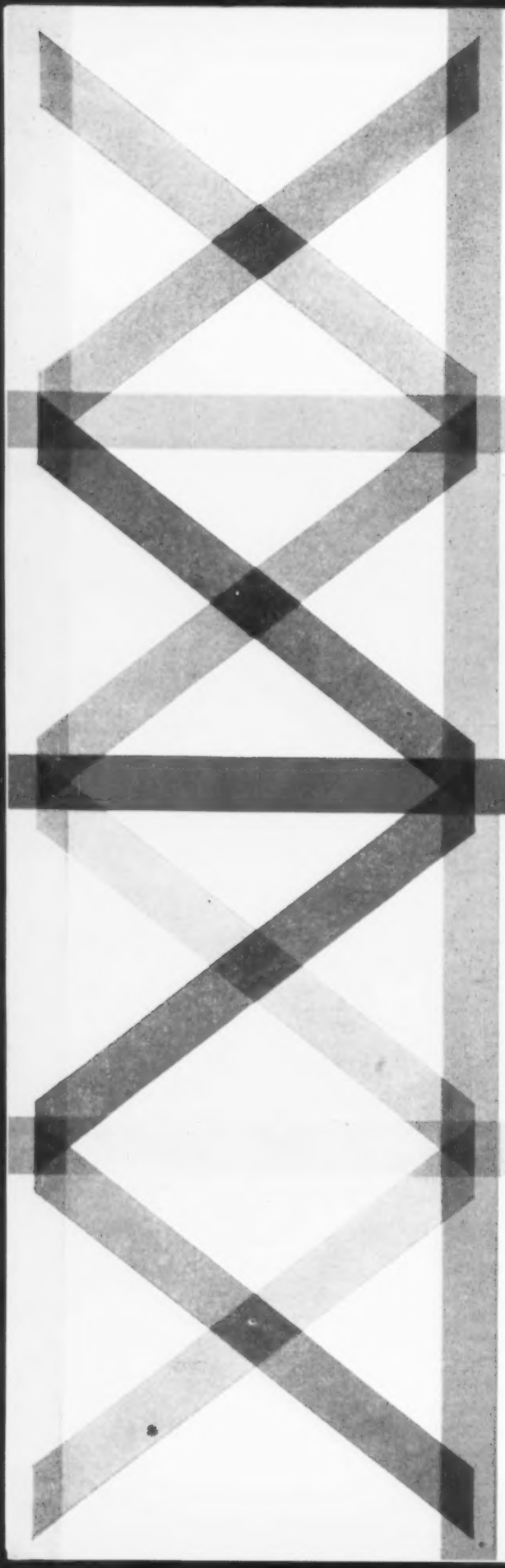
Grefco processing of OLIVE HILL brick entails:

1. Careful selection, testing, stockpiling and blending of fire clays to insure uniform raw material quality.
2. Grinding and screening to prescribed formula to promote high density of product.
3. Efficient deairing during brick forming, also to promote density and proper physical structure.
4. Careful firing to exacting temperature schedules yields uniform high quality brick.
5. Close inspection of final product with gauging and sorting of brick to close size tolerance.
6. Quality control by statistical analysis procedures for the manufacturing processes.

In service, OLIVE HILL blast furnace brick, both BF and HI-FIRED, have produced many splendid performance records in the past. OLIVE HILL linings in presently operating furnaces, are giving outstanding performance and are more than meeting the increasing requirements of the expanding American Iron and Steel Industry.

GENERAL REFRACTORIES CO.
Philadelphia 2, Pa.

GENERAL REFRACTORIES



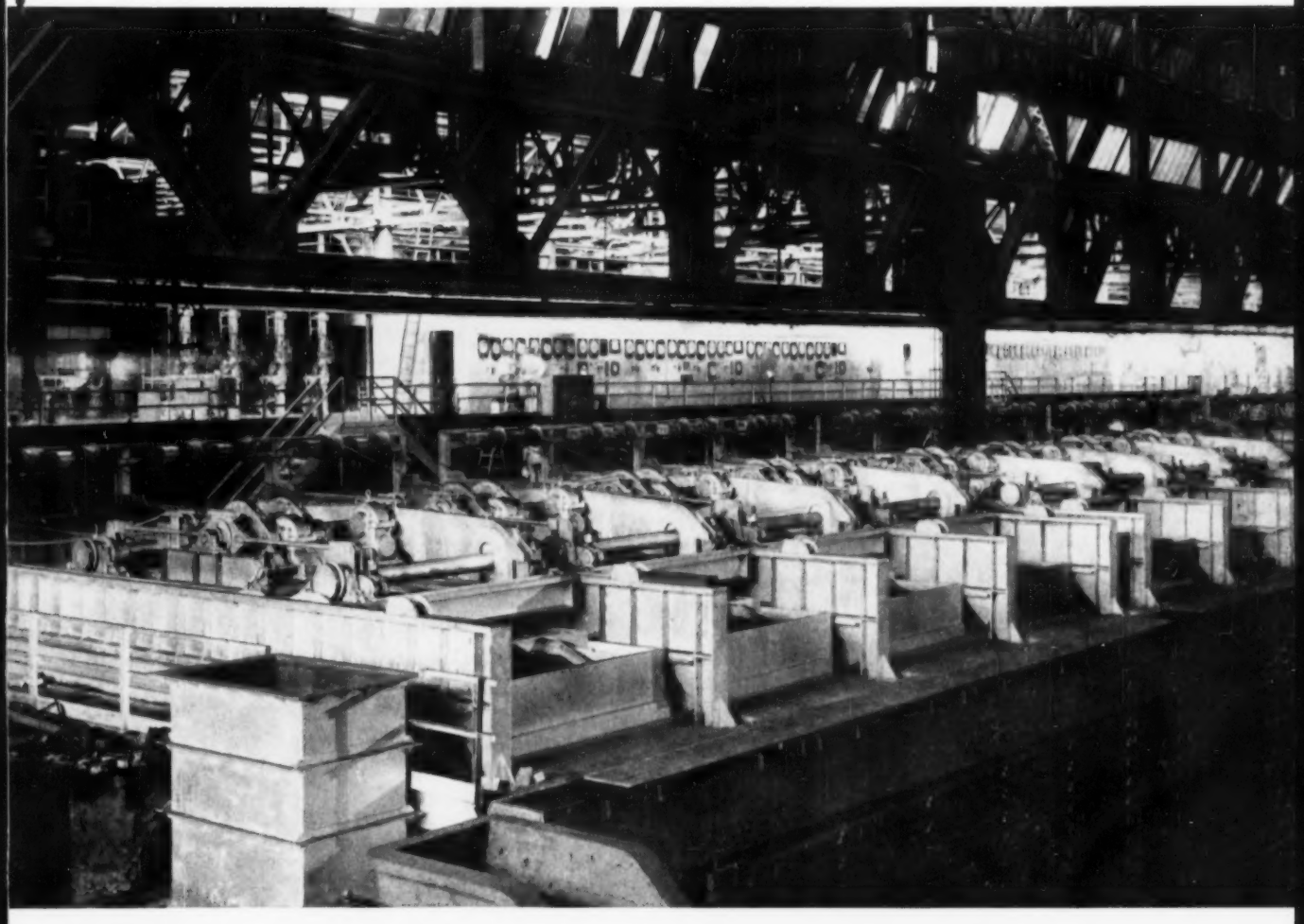
The pit nobody liked...

except our customers

This is of course our one-way fired soaking pit . . . fired from the top.

The location of the burner is only one of the features responsible for its enthusiastic acceptance. Most important however are the 30 years of experience and refinements which we have built into the pit since we first introduced it.

That is why, today, it is the pit everybody respects . . . especially our customers.



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wherever heat is used in industry

Associated Companies: British Furnaces, Ltd., Chesterfield • Stein & Atkinson, Ltd., London • Stein & Roubaix, Paris • S. A. Belge, Stein & Roubaix, Bressoux, Liege • S. A. Forni Stein, Genoa • Chugai Ro Kogyo Kaisha, Ltd., Osaka • Benno Schilde Maschinenbau, A. G., Bad Hersfeld

Surface®

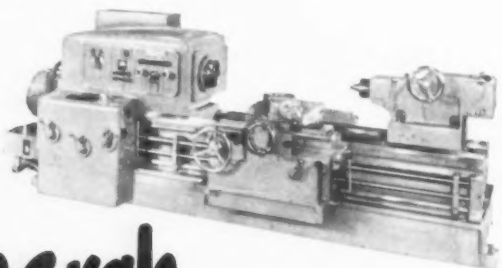
This is Production Supervisors' work?

This, and for years it's been thusly, is a cockeyed waste of time! Why should it take so much of your supervisors' time just to check their turning jobs?

You know and we know why—with all the fiddling and figuring it takes to determine and change speeds on conventional lathes, it's almost standard procedure for the operator to pick out one compromise speed no matter what Methods says. So tool life, finish and production fall far below par while rarely is the full horsepower of the machine being used, unless your supervisor spends so much time camping on the job that it hurts his overall supervisory efficiency!

Now see how you check a Monarch Dyna-Shift Job!
A quick look at the *surface cutting* speed dial.
(The operator has dialed his speed with it.) OK.
A practiced glance at, or a fast mike on
the diameter. OK. Tool and finish, OK. Next!

Monarch Dyna-Shift Lathes give you the "headstock that thinks" and a host of other exclusive features just as advanced. For better quality; for productivity increased up to 25% and tool life up to 50%; for supervisory time made more valuable to your company—arrange now for a demonstration . . . ***The Monarch Machine Tool Company, Sidney, Ohio.***



Monarch
TURNING MACHINES
FOR A GOOD TURN FASTER . . . TURN TO MONARCH

On the Monarch Dyna-Shift Lathes, you merely dial the desired surface cutting speed—and presto! the machine makes the shift automatically. See them.

EXHIBITS, MEETINGS

Continued from P. 13

headquarters, 9 Spring St., Princeton, N. J.

Scientific Apparatus Makers Assn. —Annual meeting, Apr. 27-May 2, Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 20 N. Wacker Dr., Chicago.

Assn. of Iron & Steel Engineers—Spring conference, Apr. 29-May 1, Netherland Plaza Hotel, Cincinnati. Society headquarters, 1010 Empire Bldg., Pittsburgh.

Metal Powder Assn. — Annual meeting, Apr. 30-May 1, Drake Hotel, Chicago. Society headquarters, 130 W. 42nd St., New York.

Investment Casting Institute—Annual spring meeting, Apr. 30-May 2, Sheraton Park Hotel, Washington, D. C. Society headquarters, 27 E. Monroe St., Chicago.

MAY

Society for Experimental Stress Analysis — Spring meeting and exhibit, May 1-3, Hotel Statler, Boston. Society headquarters, P. O. Box 168, Cambridge 39, Mass.

American Institute of Electrical Engineers—Northeastern district meeting on computers and controls in engineering, May 1-3, Wendell-Sherwood Hotel, Pittsfield, Mass. Society headquarters, 33 West 39th St., New York.

National Machine Tool Builders' Assn. — Spring meeting, May 1-3, Sheraton Park Hotel, Washington. Society headquarters, 2071 E. 102nd St., Cleveland.

National Assn. of Architectural Metal Manufacturers — Nineteenth annual convention, May 7-12, Fairmont Hotel, San Francisco. Society headquarters, 228 N. La Salle St., Chicago.

The PROOF of a COMPANY

(for example, DSC)

is in the way it GROWS and in the CUSTOMERS IT KEEPS

IN THE BEGINNING — DSC started in 1923 as a "dot" on the map of Detroit and not much more in the steel industry . . . with a single plant, a single product (Cold Rolled Steel Strip), a capacity of 1,000 tons a month and about 150 employees.

TODAY — Now there are three DSC plants, about 5,000 employees and the range of products is shown below.

PORTSMOUTH DIVISION, NEW BOSTON, O.

Producers of

Coke . . . Coal Chemicals . . . Pig Iron
BASIC OPEN HEARTH STEEL
Ingots . . . Blooms . . . Slabs
Billets . . . Wire Rods
Hot Rolled and Cold Rolled Sheets
Manufacturers' and Specialty Wire
Aluminum Cable Strand Reinforcement
Rope Wire . . . Tire Bead Wire
Welded Wire Fabric for Concrete Reinforcement

MILL DIVISION

DETROIT, MICH. HAMDEN, CONN.

Producers of

Cold Rolled Steel Strip
Flat Cold Rolled Spring Steel

HOW DSC GREW — The annual capacity of our Detroit and Eastern plants combined is 225,000 tons of Cold Rolled Steel Strip and Flat Cold Rolled Spring Steel.

Our Portsmouth Division has annual capacities of 550,000 tons of coke, 768,000 tons of pig iron, 1,500,000 tons of basic open hearth steel with facilities for proportionate capacities of Hot Rolled and Cold Rolled Sheets, and Rod and Wire commodities.

WHAT IT MEANS — If this growth can be attributed to any one reason—it is that over the years, under changing business conditions, DSC products, policies and practices have performed profitably for an increasing number of customers . . . and we're still growing.

Would you like a DSC Customer "Rep" to see you about your profitable use of DSC products and services?

Call him . . . today?

Customer Satisfaction Is Our Business

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE - DETROIT 9, MICH.

DSC CUSTOMER "REP" OFFICES—Charlotte, N.C., Chicago, Cincinnati, Cleveland, Columbus, O., Dayton, O., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., Milwaukee, Wis., New York, St. Louis, Toledo, O., Worcester, Mass.

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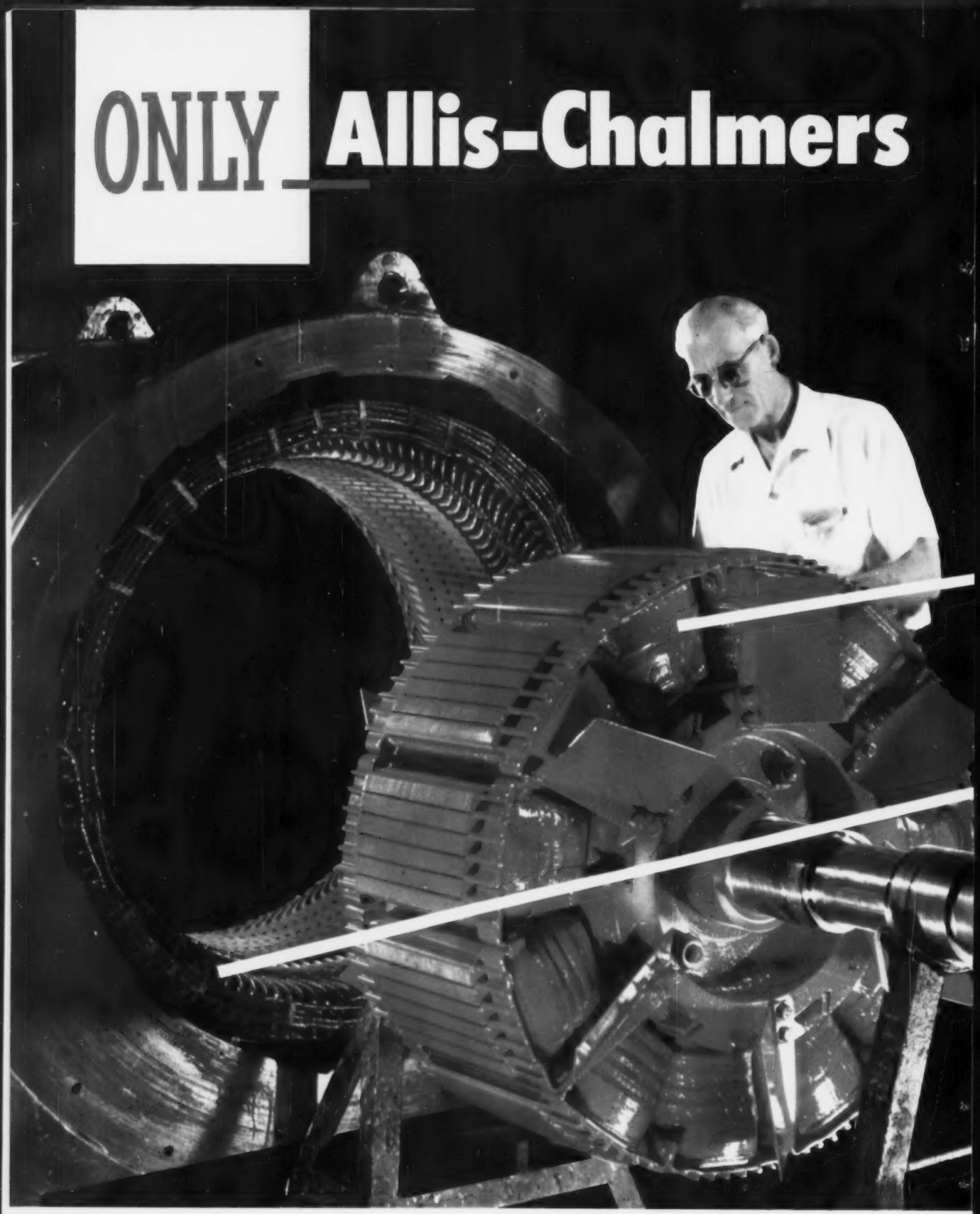

ONLY Allis-Chalmers
ALLIS-

MOTORS are "double protected"

New Integrated Field Coils Plus *Silco-Flex* Stator Insulation Provide Superior Motor Protection... Under Any Operating Conditions

1

Integrated Field Coils are bonded in heat-stabilized resins, enclosed in a resin-impregnated sheath of oriented glass fibers and bond-locked on the pole structure . . . dimensionally stable to withstand heating and thermal shock, vibration and fatigue at elevated temperatures . . . sealed throughout against atmospheric contaminants and fully protected against destructive forces.

2

***Silco-Flex* Insulation** provides a homogeneous, void-free insulating wall of silicone rubber on stator coils. It is unexcelled in life and thermal stability at high temperatures . . . resistant to most chemicals, water, weather . . . outstanding in flexibility and resilience . . . able to withstand abrasion and corona . . . resistant to physical and mechanical forces.

Exclusive Allis-Chalmers "double protection" is available on large electrical machines with operating temperatures through Class B range.

Silco-Flex is an Allis-Chalmers trademark.

For more information on these quality insulation systems contact your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin for Integrated Field Coil Bulletin 05R8525 and *Silco-Flex* Insulation Bulletin 05R8341.

Allis-Chalmers "Double Protection," with integrated field coils and Silco-Flex stator coil insulation, adapts this 600-hp, 2300-volt, 600-rpm synchronous motor to the most severe operating conditions.

CHALMERS

A-C ALLIS-CHALMERS

A-5221

Made by Hadley Products Co., Inc., Marietta, O., the Electronaire filter is used in heating and air conditioning units. Features unique, permanently electrostatic thermo-plastic monofilaments. Grilles are Penmetal expanded aluminum.

They market a permanent filter with the help of expanded aluminum

Sales appeal of an Electronaire filter is permanence . . . and washability. Never needs replacing; cleans easily in water.

The retaining grilles won't rust . . . can't ever loosen . . . yet allow free passage of air and water. That's because they are shaped from remarkably versatile Penmetal expanded aluminum.

When aluminum is slit and stretched to form expanded metal, it retains its inherent advantages —gains the added features of even lighter weight, high percentage of open area and greater strength. This combination of properties offers a tremendous potential for product design and improvement. Particularly where grilles or guards are required.

So, take advantage of Penmetal expanded aluminum in your designs and in your selling. But first, you ought to have a reference copy of bulletin 507 E-M. Write today.

PENN METAL COMPANY, INC.

General Sales Office:
40 Central Street, Boston 9, Mass.

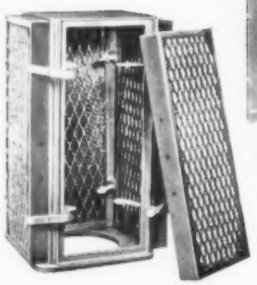
Plant: Parkersburg, W. Va.

District Sales Offices: Boston, New York, Philadelphia, Pittsburgh, Chicago, Detroit, St. Louis, Dallas, Little Rock, Seattle, San Francisco, Los Angeles, Parkersburg

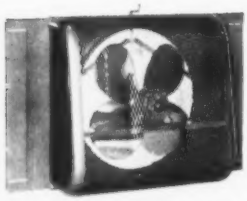
METAL MARK
Penmetal
1869
OF QUALITY

A FEW OF THE MANY OTHER USES OF EXPANDED METAL:

Air Conditioning Unit Grille (Berns Manufacturing Co., Chicago, Ill.)



Railroad Car Air Filter (Farr Company, Los Angeles, Calif.)



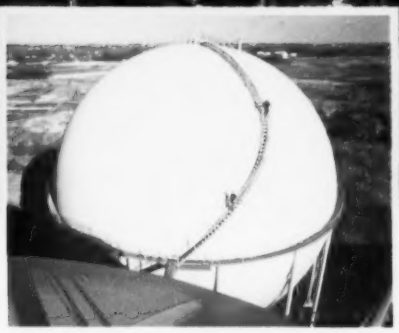
Fan Enclosure (Atlas Tool & Manufacturing Company, St. Louis, Mo.)

PM-115

IN TOKYO, JAPAN

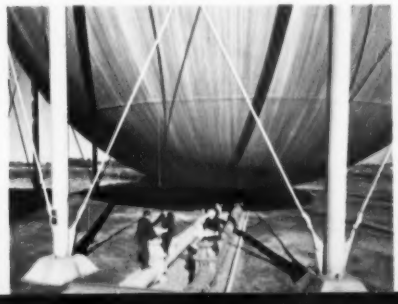
WORLD'S LARGEST USS "T-1" STEEL PRESSURE VESSELS

Beyond the Shinto shrine are the two USS "T-1" Steel spheres. They are being used by Tokyo Gas Works, Ltd., for the storage of natural gas at a pressure of 71.1 psi.



Lightweight construction—made possible by USS "T-1" Steel—cut shipping, handling and erection costs of these giant pressure vessels.

Thinner walls meant less weld metal required, less erection time needed. Lightweight construction also reduced amount and expense of foundation.



COMPARED TO CARBON STEEL CONSTRUCTION, the use of USS "T-1" Steel saved 1,720 tons of steel in the two giant pressure vessels pictured here. Having a diameter of 110.5 ft. each, they are the largest Hortonspheres ever built for the storage of gas. USS "T-1" Steel enabled Chicago Bridge & Iron Company to use 0.73-inch-thick shell plates rather than mild steel plates 1.75 inches thick.

USS "T-1" Steel's very high yield strength (90,000 psi minimum), plus previous experience in building non-code government vessels, permitted use of a maximum allowable working stress of 36,000 psi to which a 90% weld joint efficiency was applied. With the exception of the working stress values, the vessels were built to the ASME Code for Unfired Pressure Vessels where applicable.

In addition to saving 1,720 tons of steel, the thinner USS "T-1" Steel plates drastically lowered the cost of shipping to Japan. And each ton saved meant lower erection, welding and foundation costs. Added up, all these savings point out why the use of USS "T-1" Steel spells economy.

Shell plates were fabricated at CB&I's Greenville, Pa. plant and shipped to Tokyo for field erection. Field welding was done with E 12016 electrodes and did not require stress relief. All welds were 100% X-rayed.

Two additional vessels of similar design, but smaller in size, are now being fabricated by Chicago Bridge & Iron for installation in Tokyo.

USS "T-1" Steel is being used to improve performance and reduce costs in a wide variety of applications in steel mills, in mining equipment, in construction equipment, in materials handling equipment, in bridges, and even in steam turbines. Write for complete information about its application and fabrication. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

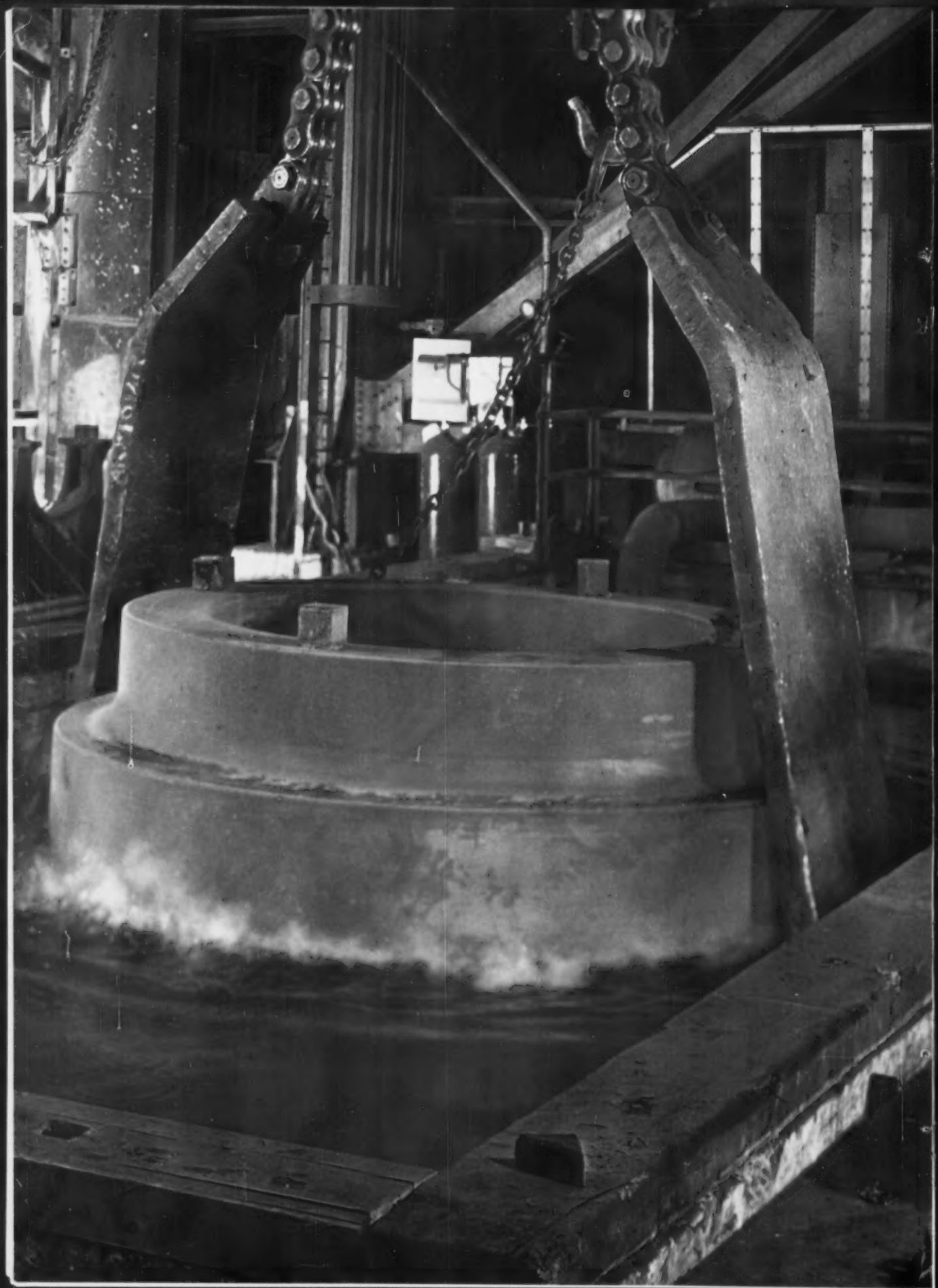
USS "T-1" CONSTRUCTIONAL ALLOY STEEL

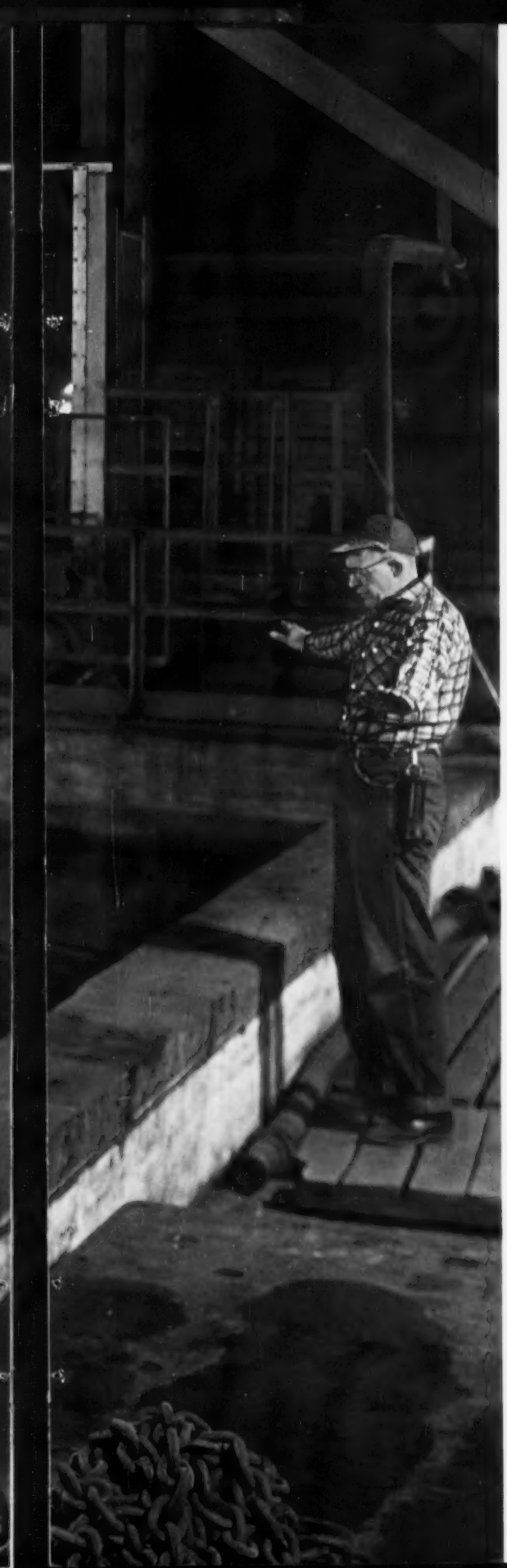
"USS" and "T-1" are registered trademarks

UNITED STATES STEEL

Watch the **United States Steel** Hour on TV every other Wednesday (10 p.m. Eastern time)

USS





"Here's the trick: quench this forging so it won't warp,"

says **A. H. Sauer,** *USS General Foreman—Heat Treating*

In the whole complex business of steelmaking, heat treating of the finished part is one of the steps that requires *exceptional* care. The problems are multiplied many times over when you have a 74-ton forging like the one in the picture—a flange forging for a nuclear power reactor.

In forgings, heating and quenching operations must be carefully controlled to insure proper structure in the steel. Using the acquired skill that only time and experience could give him, Al Sauer, a 29-year veteran in our Homestead Forgings Division, supervised the careful heating of this forging for five days. After this came the rapid quench; the entire piece was immersed in water. Then, Al had the crane lift the piece until only the lower flange was submerged. With careful timing, the piece was then submerged again for an over-all quench.

If the entire piece had been immersed for the complete quench, the thinner top section would have cooled too fast, and the resultant contraction may have warped the entire forging. But in this case, through Al's experience and supervision, the warpage was kept within practical limits.

We're not suggesting that this is the forging problem of the century. But it does show the kind of demanding assignments that are *routine* in the shop that makes USS Quality Forgings.

If you'd like a free copy of our 32-page booklet, "USS Quality Forgings," just write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

heavy machinery parts . . . carbon, alloy, stainless

forged steel rolls and back-up roll sleeves

electrical and water wheel shafts

specialty forgings of all types

USS

UNITED STATES STEEL

NOW AVAILABLE COAST TO COAST FROM WAREHOUSE STOCKS

USS FREMAX

the free-machining plate steel that

- cuts machining costs
- prolongs tool life
- speeds output
- gives smooth surface finish

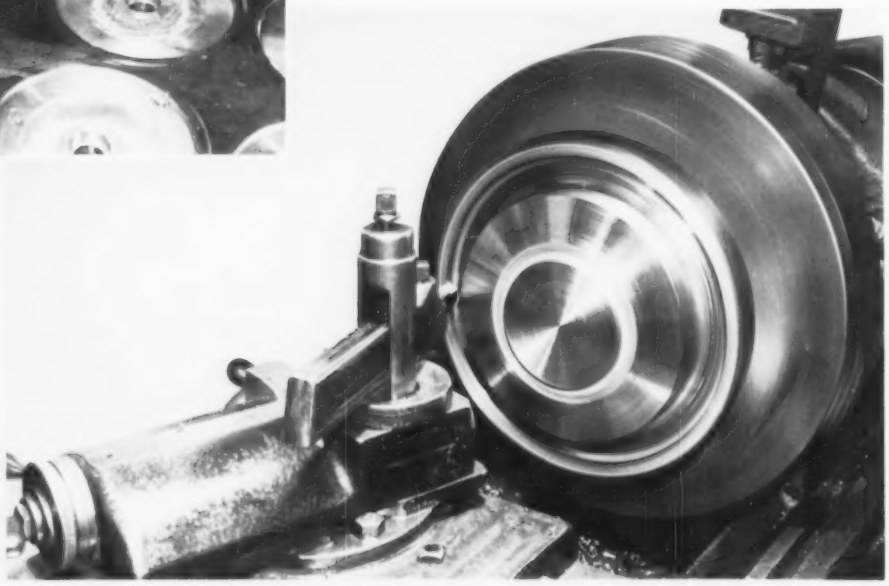
USS FREMAX is a low carbon, high sulphur, free-machining plate steel that is far superior to ordinary carbon plate steels for such machining operations as cutting, drilling, knurling, milling, broaching, shaping, turning and threading. *Tests show that* FREMAX *can be machined at cutting speeds 100 to 200% greater than SAE 1020 plate steel while still maintaining the same tool life,* thus enabling you to obtain higher production and lower cost per item.

You will find USS FREMAX ideally suitable for dies and molds where a smooth, unblemished surface finish is a prime factor. FREMAX is easy to weld, enabling you to make strong, sound, tight welded joints.

We can give you immediate delivery on USS FREMAX plate steel. Just phone, wire or write us at Chicago, or contact any of our warehouses.

Prompt Delivery

from your nearest warehouse



This core for a rubber brake seal mold shows the fine surface finish obtainable on USS FREMAX plate steel.

U. S. STEEL SUPPLY

DIVISION

P. O. Box 1099, Chicago 90, Ill.

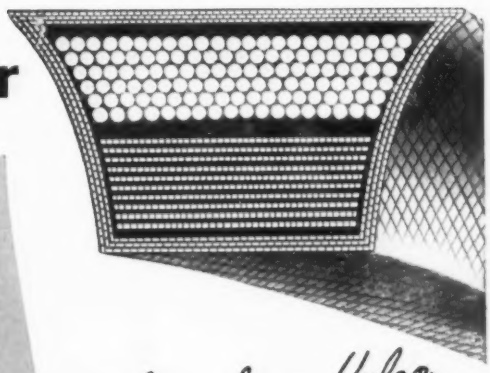
General Offices:
208 S. LaSalle Street, Chicago 4, Ill.

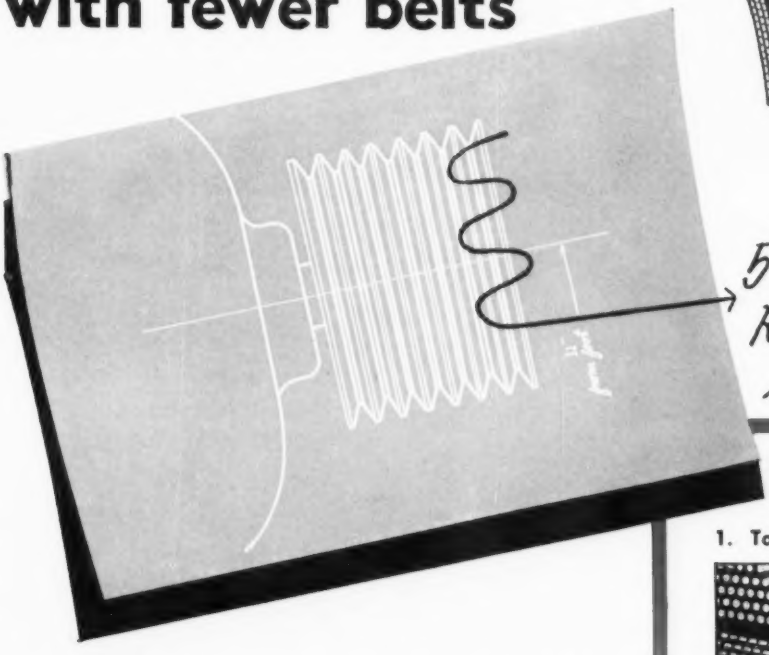
Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL

Cut sheave width and weight...

get same horsepower with fewer belts





5 Gates Super Vulco Ropes do the work of 7 standard V-belts

Where space is limited and weight a factor, design your drive with this important fact in mind:

5 Gates Super Vulco Ropes do the work of 7 standard V-belts

That's because a Gates Super Vulco Rope has 40% more horsepower capacity — delivers more horsepower per dollar invested than any standard V-belt drive. Sheaves with fewer grooves cost less . . . weigh less . . . take less room. Drive design is invariably improved.

A wealth of drive data is quickly available to you. Simply call your nearby Gates distributor for a Gates V-belt specialist. Stocks carried in industrial centers around the world.

The Gates Rubber Company
Denver, Colorado

GATES Distributors are in the Yellow Pages

The Mark of Gates *Specialized* Research

No other V-Belt has ALL these advantages

1. Tough, resilient Tensile Cords

Super strong resilient tensile cords provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required . . . save weight and space.

2. Concave Sidewalls (U.S. Pat. 1813698)

Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Flex-Weave Cover (U.S. Pat. 2519590)

A Gates exclusive: provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

4. High Electrical Conductivity

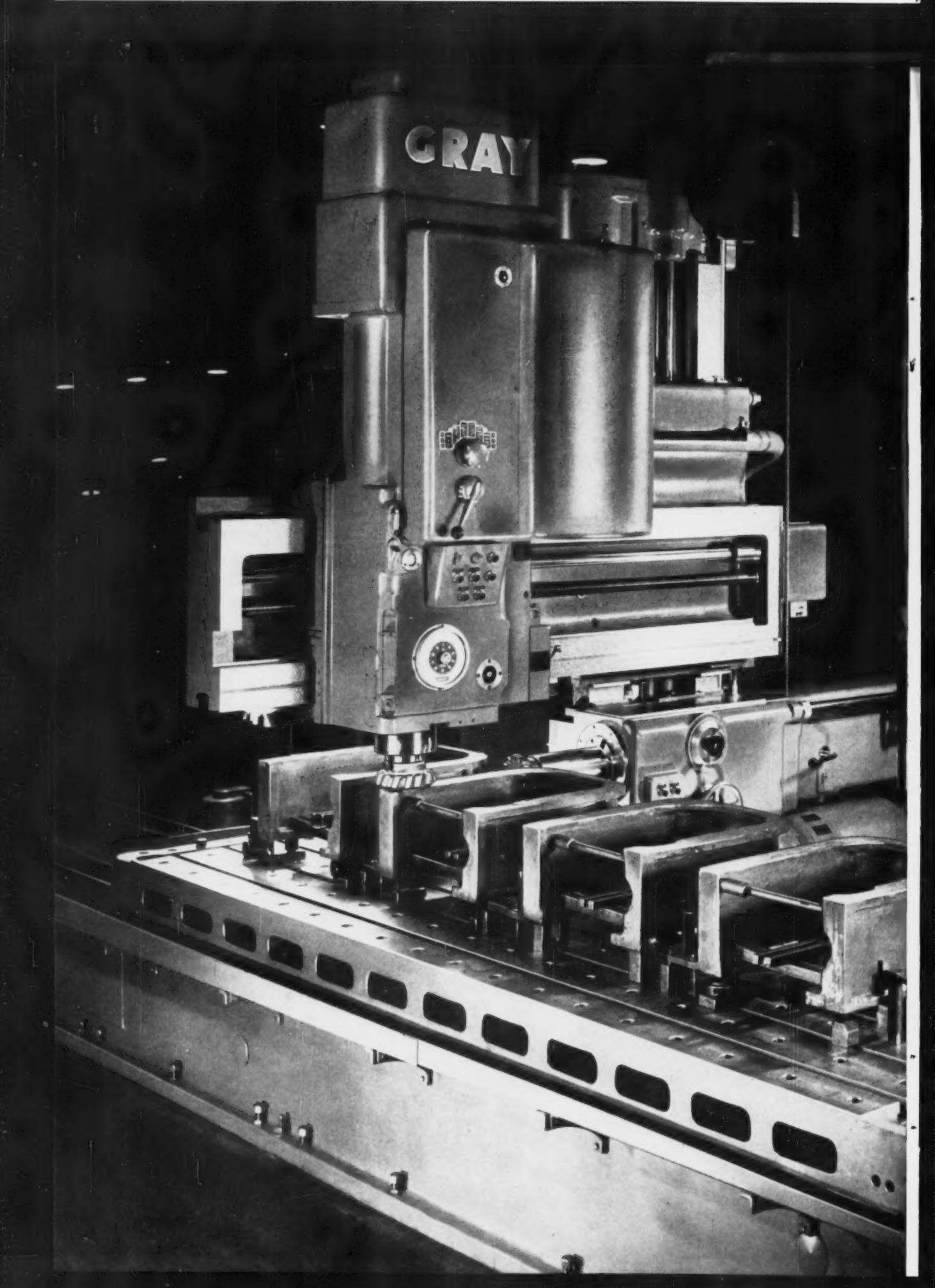
Built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

5. Oil, Heat, Weather Resistant

Special rubber compounds make Super Vulco Ropes highly resistant to heat, oil, and prolonged exposure to weather.

TPA 248

Gates Super VULCO ROPE Drives


GRAY

If you're tired of seeing small jobs on your large expensive millers . . .

If you're tired of extra set-ups because your miller has only a single head . . .

If you're tired of whittling away at rugged jobs with low power heads . . .

If you're tired of complicated controls that make your operator a mountain goat . . .

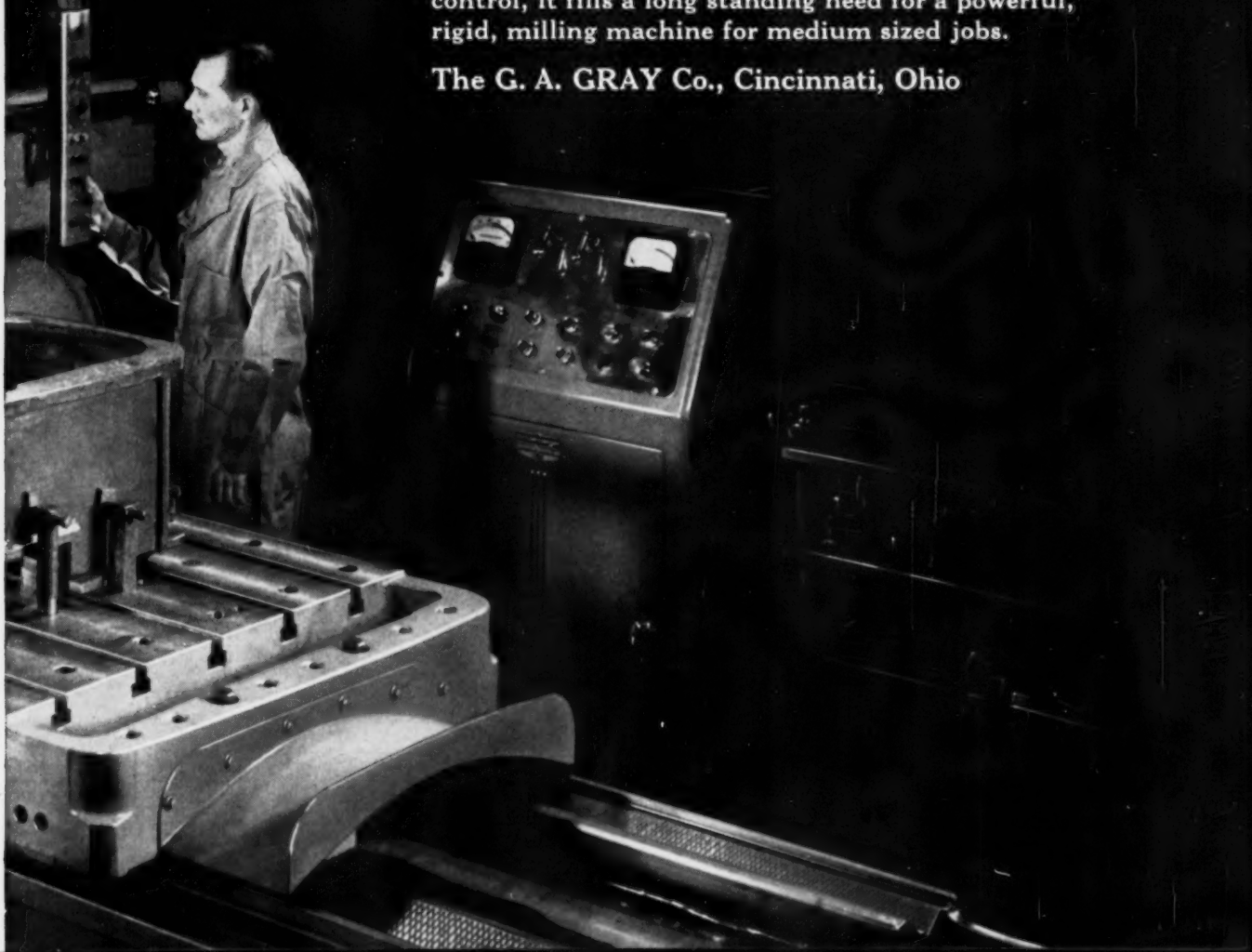
this new

GRAY HANDYMILL

is for you

Built in a wide range of high horsepower sizes, with great variety in head combinations, simplified pendant control, it fills a long standing need for a powerful, rigid, milling machine for medium sized jobs.

The G. A. GRAY Co., Cincinnati, Ohio

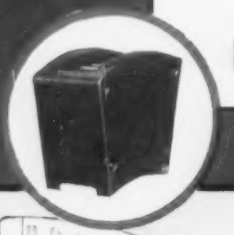


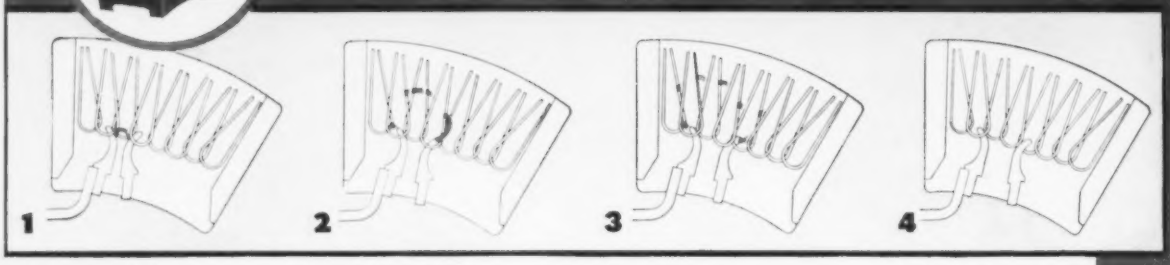
for fast arc interruption... without blowout coils

ALLIS-CHALMERS

TYPE 425 CONTROL

featuring *ACBO* arc-centering blowout chutes for 50 to 400 hp



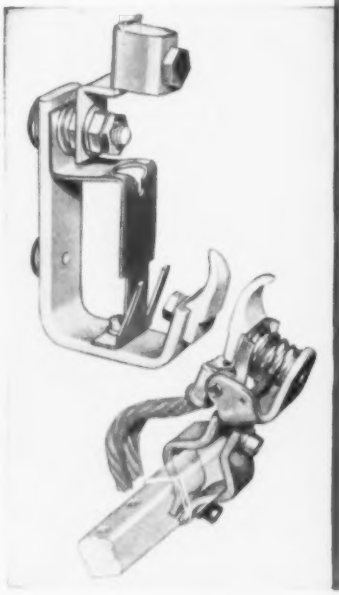


1 Arc across contacts as they start to open.

2 Strong blowout action forces arc to center.

3 Arc rupturing.

4 Contacts fully open — arc extinguished.



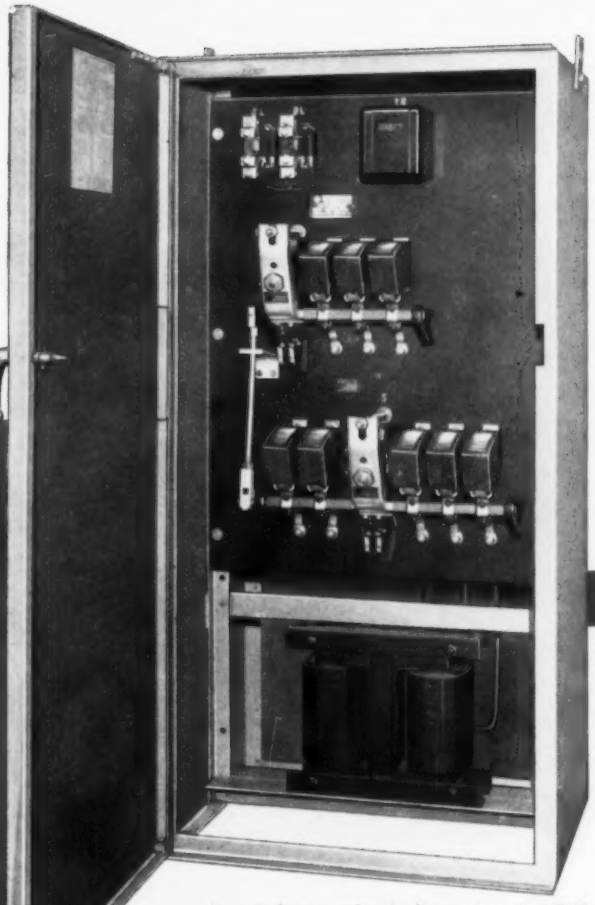
Advanced electrical design

Allis-Chalmers Sizes 4, 5 and 6 Type 425 starters and contactors incorporate the *ACBO* arc chute for much longer contact and chute life . . . for maximum contactor efficiency . . . for improved performance. This unique but simple device utilizes the principles of magnetic action and thermal convection to center, rupture and extinguish the arc — *quickly* . . . without the use of conventional blowout coils.

Simplified mechanical design

- Streamlined clapper-type construction eliminates many parts — permits natural arc rise in arc chute.
- Accessibility simplifies inspection and maintenance.
- Installation is fast and easy. Ample wiring space is provided by *sensible* enclosure dimensions . . . by well-placed concentric knockouts, terminal lugs and conduit hubs. Terminals are clearly marked.

ALLIS-



Autotransformer reduced-voltage starter in NEMA 1 enclosure with 3 and 5-pole Size 4 contactor.

A type for any application

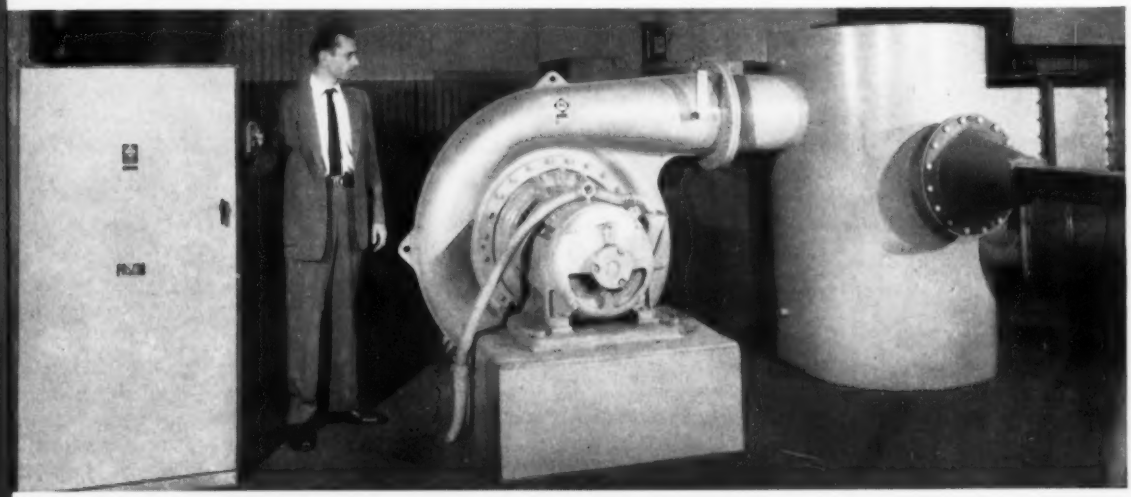
- Across-the-line general purpose starter
- Combination starter with disconnect switch
- Combination starter with circuit breaker
- Reversing starter
- Multi-speed starter
- Autotransformer reduced-voltage starter
- Primary reduced-voltage starter
- Magnetic increment-type starter (part winding)
- Magnetic star-delta starter
- Wound-rotor motor starter
- Synchronous motor starter
- Low voltage group control
- Ac magnetic contactor

Modifications available for applications requiring special features or design.

Engineering help

Allis-Chalmers offers expert engineering and application advice. Product specialists, industry application experts, modern laboratory and testing facilities . . . are all available for coordinated effort to help solve your control problems.

For detailed information on Type 425 control, call your A-C Control Distributor or your local A-C District Office . . . or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis. Ask for Bulletin 14B8615.



Size 4, reduced-voltage autotransformer starter for 50-hp, 3550-rpm induction motor driving turbo-blower. Motor and blower also built by Allis-Chalmers.

ACBO is an Allis-Chalmers trademark.

CHALMERS

A-C ALLIS CHALMERS

A-5342

Lectromelt

by agreement with

Demag-Elektrometallurgie, G. m. b. H.

Duisburg, Germany

is pleased to announce that they now have
the exclusive license in the
United States and Canada for the
manufacture of

DEMAG ELECTRIC SMELTING FURNACES

for all smelting,
refining and reduction operations

•

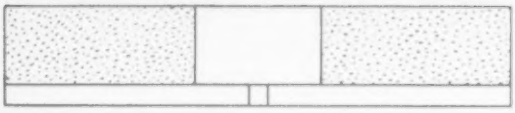
You are invited to send requests for
engineering service or product information to

LECTROMELT FURNACE DIVISION
McGraw-Edison Company
312 32nd Street • Pittsburgh 30, Pennsylvania

Change to Gardner abrasive increases production per disc 500%

Increase from 55,000 to 300,000 parts per disc... with lower unit grinding cost... due to longer disc life

Former type disc



In flat surfacing operation grinding cast iron flanges, the disc in use required frequent replacement. Longer disc life was sought. The Gardner Abrasives Specialist was called in to study the problem.

Gardner type disc

A Gardner combination disc was recommended with smooth outside surface and deep corrugations inside. It withstands heavy stock removal, runs cooler, lasts over five times longer.

GARDNER

abrasive discs

BELOIT, WISCONSIN

STAINLESS STEEL MAKES THE DIFFERENCE

...its effect on modern styling

Clean lines. A crisp, new look. More functional. Lasting beauty. These are some of the effects modern designers gain with stainless steel—why they use more and more stainless steel every year in cars as well as appliances, housewares, furniture and houses.

To marketers, stainless steel combines the smart selling values of beauty and easy maintenance with the hard selling values of superior corrosion resistance, durability and toughness.

Stainless steel is available in countless work-saving standard shapes. It's readily machined, formed, joined, or cast.

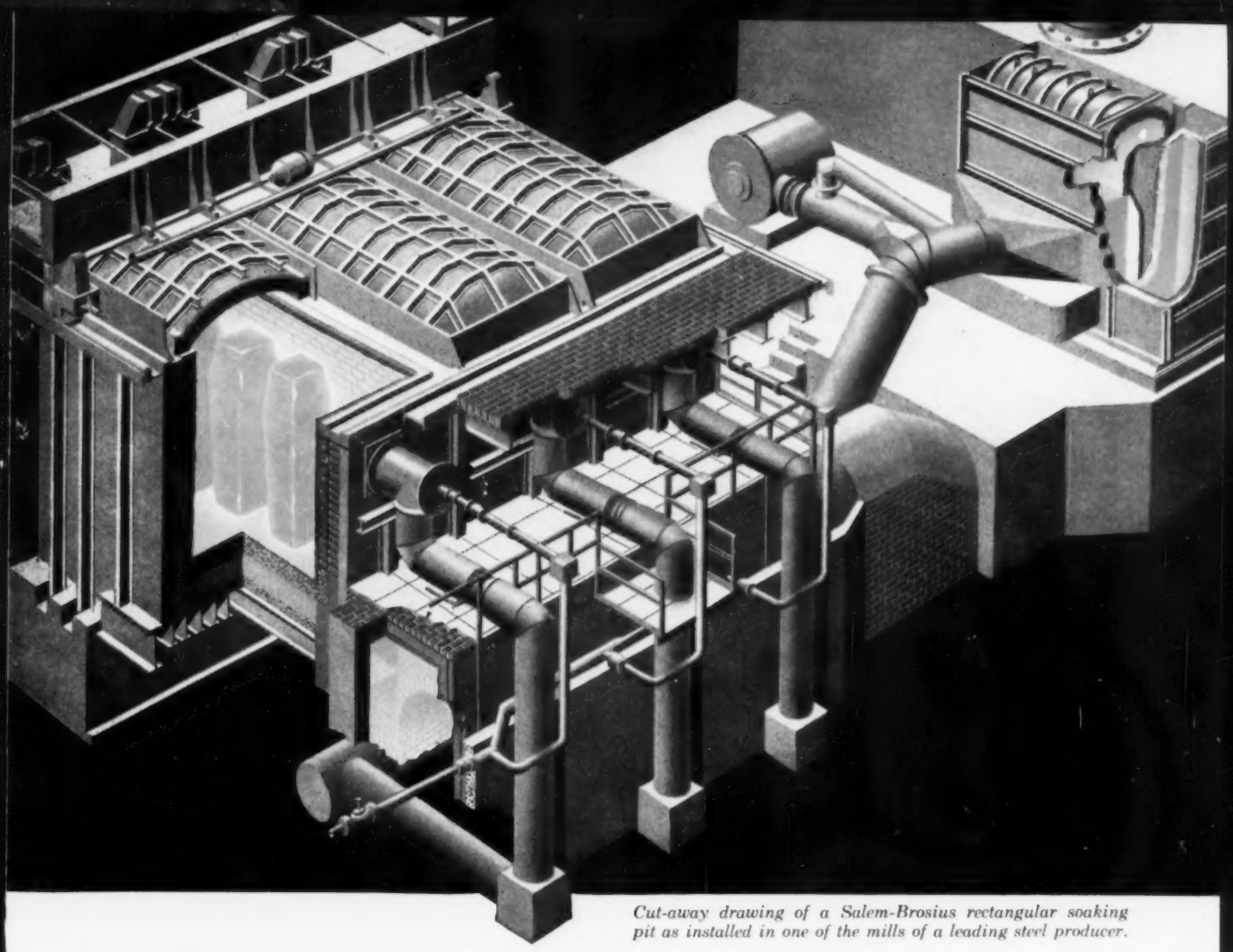
For more facts about stainless steel and the contribution it can make to your product or marketing problems, see your stainless steel supplier or write ELECTROMET—leading producer of more than 100 alloys for the metal industries, including chromium and manganese used for making stainless steels.

ELECTRO METALLURGICAL COMPANY
A Division of
Union Carbide and Carbon Corporation
30 E. 42nd Street UCC New York 17, N.Y.

METALS DO MORE ALL THE TIME
...THANKS TO ALLOYS

Electromet
Trade-Mark
FERRO-ALLOYS AND METALS

Stainless steel styling . . . first to catch the eye and quickest to capture the heart of the consumer. It combines beauty with hardness and strength to resist denting and scratching—and rust is never a problem.



Cut-away drawing of a Salem-Brosius rectangular soaking pit as installed in one of the mills of a leading steel producer.

Users are the best salesmen of Salem-Brosius soaking pits

"We have again specified Salem-Brosius rectangular soaking pits for our expansion program," reports an operating official of a major steel company using pits installed by several manufacturers. "The previous installation heated more steel ingots ready for rolling with less fuel consumption, less maintenance cost, and better temperature uniformity than any other type of pit in our plant."

Reports like this are typical, not only about these rectangular soaking pits, but all other Salem-Brosius heating and heat-treating furnaces as well. Salem-Brosius engineers, both here and abroad, possess an enviable record for designing furnaces which produce maximum, high-quality output at minimum operating cost. If your expansion or modernization plans call for ingot soaking pits or any other heating or heat-treating furnaces, Salem-Brosius, Inc. would appreciate an inquiry.

SALEM-BROSIUS, INC.

CARNEGIE, PENNSYLVANIA

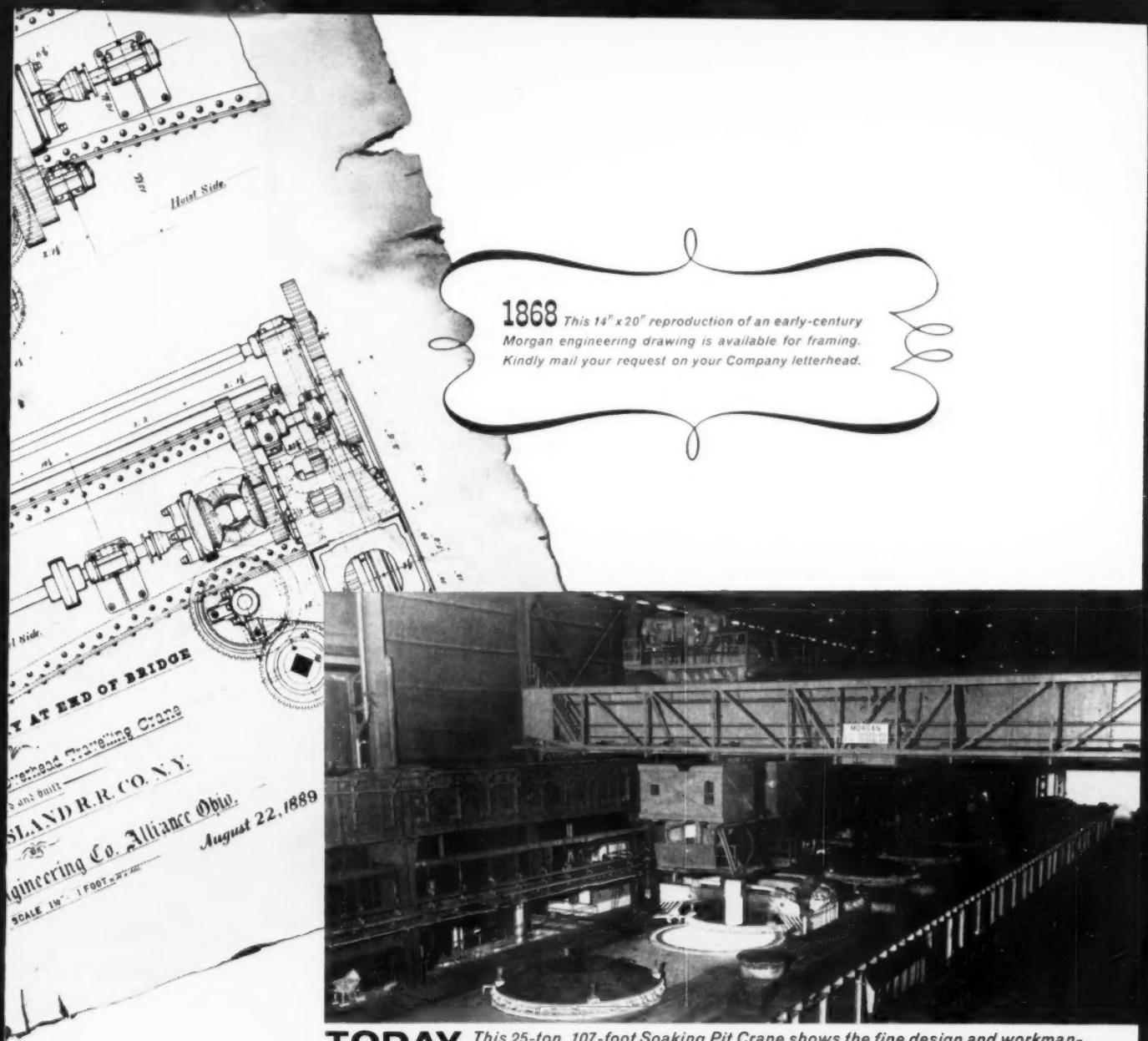
In Canada: Salem Engineering Limited, 1525 Bloor Street West, Toronto, Ontario

You save the most

QUALITY in every detail is a

Since 1868, the advanced design and quality construction of Morgan cranes and mill equipment have been the highest standard in the industry.

Today, through research and the development of improved equipment features—modern and efficient production methods—Morgan continues to offer the steel industry equipment that is



1868 *This 14" x 20" reproduction of an early-century Morgan engineering drawing is available for framing. Kindly mail your request on your Company letterhead.*

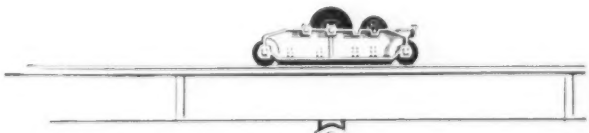
TODAY *This 25-ton, 107-foot Soaking Pit Crane shows the fine design and workmanship, the attention to details which has always typified Morgan Cranes.*

by buying the best...

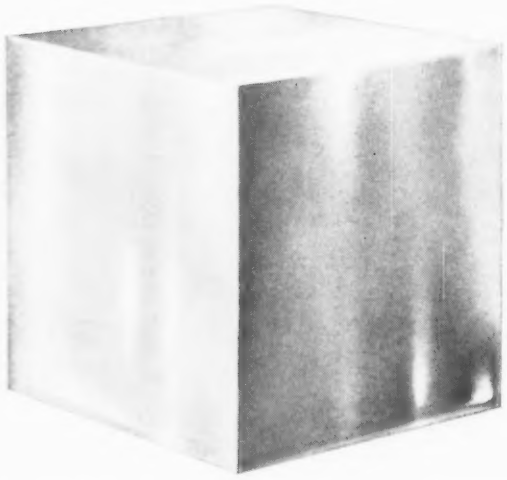
tradition with Morgan cranes and mill equipment

less costly to operate and maintain. Let our representative show *you* how to save the most by buying the best . . . MORGAN!

Overhead electric traveling cranes, gantry cranes, open hearth special cranes, plate mills, blooming mills, structural mills, shears, saws and auxiliary equipment.

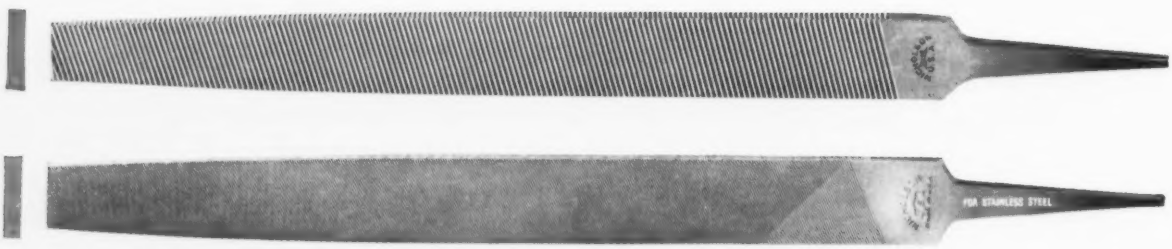


THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*



For soft lead...or durable stainless steel...

Nicholson makes a file for every purpose



Whether you work with soft lead or babbitt . . . or whether you have to file rugged stainless steel . . . there's a Nicholson-made file that's been designed specifically for the job at hand.

Not only do we make the world's finest files, but we make them to meet every industrial need—for the softest metals and the hardest . . . for the most delicate instruments and for those big jobs that require rapid but efficient metal removal.

You can select Machinist's files . . . Regular Purpose files and rasps . . . Special Purpose files for aluminum or plastics . . . X.F. (*EX*tra *F*ine) Swiss Pattern files in hundreds of shapes and sizes . . . over *6000* high-quality varieties.

If you work with metal, you can use Nicholson or Black Diamond files

NICHOLSON U.S.A.

NICHOLSON FILE COMPANY, PROVIDENCE, RHODE ISLAND

In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario

BLACK DIAMOND U.S.A.

NICHOLSON FILES ***A FILE FOR EVERY PURPOSE***

WHEELABRATOR® STEEL SHOT

cuts abrasive costs for *ALL TYPES* of foundries

Mass Production Automotive Gray Iron Foundry

Saves $13,365 in 1 year!

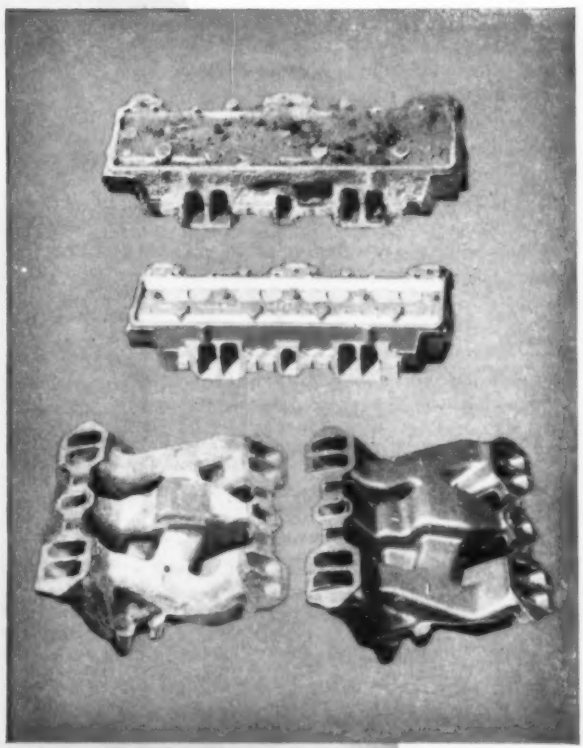
Wheelabrator Steel Shot's enviable success in solving cleaning problems is the reason why more than 1200 firms converted to this heat-treated, electric arc furnace steel shot within two years' time. Practically every conceivable cleaning problem was encountered within these plants. In every case Wheelabrator Steel Shot cut abrasive costs and provided other valuable benefits.

Typical of this success is the saving in abrasive cost experienced in a large, automotive gray iron foundry. By switching to Wheelabrator Steel Shot a 17.3c reduction on every ton of castings cleaned was effected. On the 309 tons of gray iron castings cleaned daily, this amounts to a daily saving of $53.46. Figuring 250 working days per year makes annual savings of $13,365, a 15.5% reduction in abrasive costs.

The resistance to breakdown, which is responsible for these savings with Wheelabrator Steel Shot, also results in a better product finish. As the cleaning room foreman points out, "Wheelabrator Steel Shot stays round longer instead of breaking down into fines. Because of this we get a better finish in a shorter period of time."

FOR MORE INFORMATION

on the many ways Wheelabrator Steel Shot can help you save, write today for Catalog 89-B.



WHEELABRATOR CORPORATION

510 South Byrkit Street, Mishawaka, Indiana

World's Largest Manufacturer of Steel Abrasives

Unequalled barrel finishing ...with 4 different TUMBLEX* abrasives

Here are vital steps that will give you exactly the results you're looking for on deburring, descaling and finishing your products.

One is to switch from out-of-date tumbling or off-hand methods.

The other is to check Norton Tumblex materials and learn which, together with modern barrel finishing techniques, make the best combination to meet your particular requirements.

The long, expert experience of Norton engineers in developing Tumblex abrasives has brought the value-adding, cost-cutting "Touch of Gold" to barrel finishing of the widest range of products. To you, this means prompt aid in solving finishing problems. Just send sample parts, ranging from tiny needles to hefty forgings, to the Norton Sample Processing Department. You'll get helpful recommendations as to the type and size of Tumblex material to use — plus other data on the tumbling barrel equipment and operating methods you need most. **Or write, to Norton Company, Worcester 6, Mass.** for a copy of the newly revised handbook on barrel finishing. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

G-323

ALUNDUM* Tumblex "S". Newly developed bonded spheres that easily get into areas where other abrasive shapes can't reach. Exceptionally dense and long lasting, for top barrel finishing in many applications. In five different sizes.

ALUNDUM Tumblex "T". Bonded, triangular shape, and fast cutting for special shaped parts. Triangular form prevents wedging in work slots or holes. Available in four sizes.

ALUNDUM Tumblex "A". The workhorse for general barrel finishing. Performs several operations at once, removing flash, scale, tool marks and burrs, while forming radii and finishes to required microinch. Made in eleven sizes.

Tumblex "N". Natural stones, offered exclusively by Norton, for high lustre, especially on die castings and soft metal. Rounded uniform shape brings out the most desirable color of finished parts. In seven sizes.

NORTON
ABRASIVES

Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Behr-cat Tapes

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

Save Time, Maintenance and Money In Your Metal-Melting . . .

Specify Norton Refractory Cements

FOR FERROUS METAL-MELTING

type of equipment	metals melted	use of cement	Norton cement recommended			how applied
			number	maturing temperature		
indirect arc	alloy iron and steels	lining	RA 1307	1150°C	2100°F	rammed
		patching	RA 1307 RA 1162	1150°C 1000°C	2100°F 1850°F	rammed rammed
direct arc	alloy steel and malleable iron	troweling around electrodes	RA 1162	1000°C	1850°F	trowled
		lining roof and around electrodes	RA 1307	1150°C	2100°F	rammed
high frequency induction	stainless steel and refractory alloys	lining	RM 1170	1150°C	2100°F	rammed (dry)
		patching large furnaces	RM 1152	1200°C	2200°F	rammed
		patching small furnaces	RM 1992	1100°C	2000°F	troweled or rammed
ladles	iron and steel	lining	RA 1307	1150°C	2100°F	rammed

FOR NONFERROUS METAL-MELTING

low frequency induction	Al, Te, Si bronzes	lining	RM 1140	1250°C	2300°F	rammed
	general purposes	lining	RA 1307	1150°C	2100°F	rammed
indirect arc	brasses and bronzes	lining and patching	RA 1307	1150°C	2100°F	rammed
crucible melting furnaces ■	brasses and bronzes	lining and patching	RC 1188	1100°C	2000°F	rammed
reverberatory furnaces ▲	brasses and bronzes	lining and patching	RC 1188	1100°C	2000°F	rammed

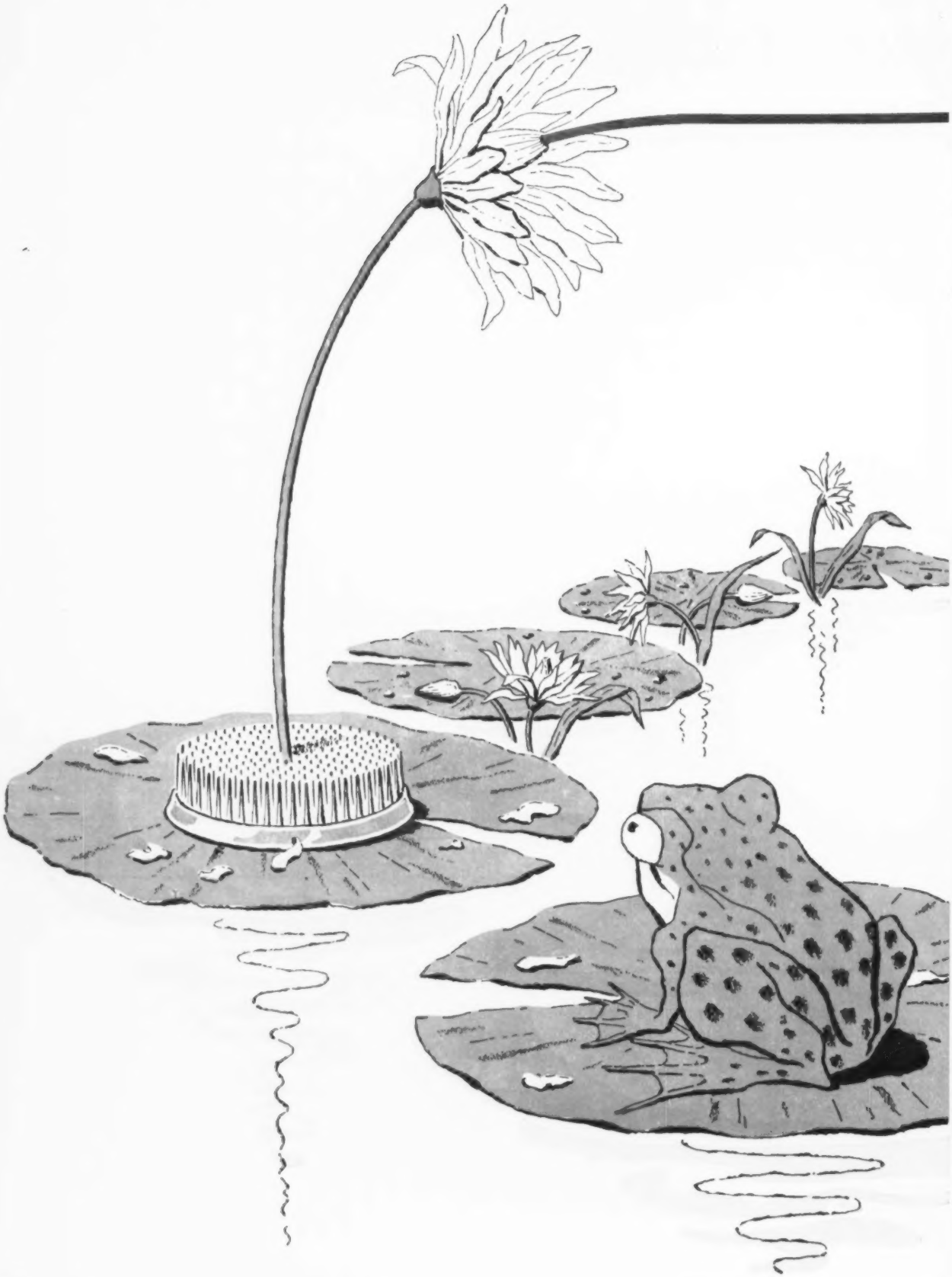
■ Cement not in contact with metal; used in combustion chamber. ▲ Cement in contact with metal.

Norton ALUNDUM* fused alumina (RA), CRYSTOLON* silicon carbide (RC) and MAGNORITE* fused magnesia (RM) cements are stable and very refractory. Carefully blended to assure proper grain size distribution, they are excellent for the widest range of operations.

For complete facts as to the nature and selection of these *engineered and prescribed* Norton ℞'s, contact your Norton Representative. He'll supply you with the booklet *Norton Refractory Cements.* Or write for your free copy to NORTON COMPANY, Refractories Division, 205 New Bond Street, Worcester 6, Mass.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

NORTON
REFRACTORIES
Engineered... ℞ ...Prescribed
Making better products... to make your products better
NORTON PRODUCTS: Refractories • Abrasives Grinding Wheels • Grinding Machines
BEHR-MANNING DIVISION PRODUCTS: Coated Abrasives, Sharpening Stones • Behr-cat Tapes



Frogs and Florists

Florists keep flowers in place by sticking the stems into the sharp pins of a florist frog—sharp pins that are often made from hard drawn, low carbon CF&I-Wickwire Pin Wire which is free from scratches and other surface imperfections.

Chances are you don't need wire to make florist frogs. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

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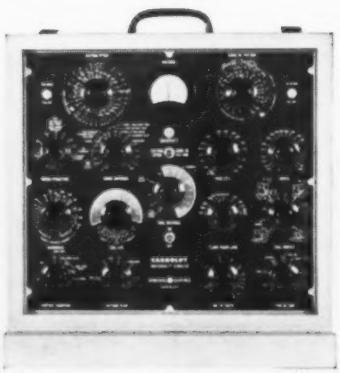

CARBOLOY®
MACHINABILITY COMPUTER

- Ends time-consuming tryout runs; saves valuable stock
- Shows you how to get maximum machine output at lowest cost

JUST DIAL IN KNOWN MACHINING DATA... SOLVE TOOL SETUP PROBLEMS IN SECONDS

The Carboloy Machinability Computer accurately predicts how your tools and machines will perform on any job. Faster than any other method of figuring job setups, it calculates the effect of 19 basic machining variables on machine performance, tool life, and output.

With this information, you can check the accuracy of existing setups, determine new machining standards, eliminate costly pilot runs. With the Computer, you can quickly see how to vary operating conditions to gain maximum efficiency from the cutting tool, the machine, and the operator. Simply set up the known machining variables on the Computer dials . . . then adjust the unknown variable until the Computer shows that the correct setting has been reached.

Hundreds of Carboloy Machinability Computers are now in use throughout industry . . . on jobs ranging from initial setups to trouble-shooting. The Computer is portable and rugged; priced at $495 (f.o.b. Detroit). For more information, or a demonstration in your plant, write: *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Street, Detroit 32, Michigan.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

Why *Dish-Quik*® uses Chase Free-Cutting Brass Rod!

"No other metal combines such production speed with quality results!"

HAROLD E. CONNELLY, *Purchasing Agent, Modern Faucet Mfg. Co.*

Housewives want economy and long-lasting dependability from their appliances — and the makers of Dish-Quik know it! That's why this beautifully-designed, labor-saving faucet attachment was fabricated from so much free-cutting Chase brass rod!

For one thing, using Chase free-cutting brass rod assures Modern Faucet Mfg. Co. of highest production speed and top-quality work. What's more, parts made from this tough, corrosion-resistant rod won't clog with rust from their daily contact with hot and cold water. They shrug off hard knocks that are part of frequent use.

The end result? A de-luxe product made to give more *value* to consumers — at the lowest *cost* to the manufacturer!

Bring your production problems to...

Chase®

BRASS & COPPER CO.

WATERBURY 20, CONNECTICUT

SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass, Copper and Stainless Steel

Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles Milwaukee Minneapolis Newark New Orleans New York (Maspeth, L. I.) Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

for fast service on small orders

—call CRUCIBLE

When you need just a piece or two of tool steel . . . or a single sheet of stainless . . . you can get it *quickly* from Crucible. We're geared for that kind of service. In fact small orders make up a large part of our warehouse business.

Of course we have the capacity to handle big orders just as efficiently too. But no matter what you order, you can count on fast, dependable service.

Next time you need special steels in *any quantity*, call Crucible—*big enough to serve you, small enough to want to.*

Stocks maintained of:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el . . . AISI Alloy, Onyx Spring, Hollow Drill Steel and other Special Purpose Steels

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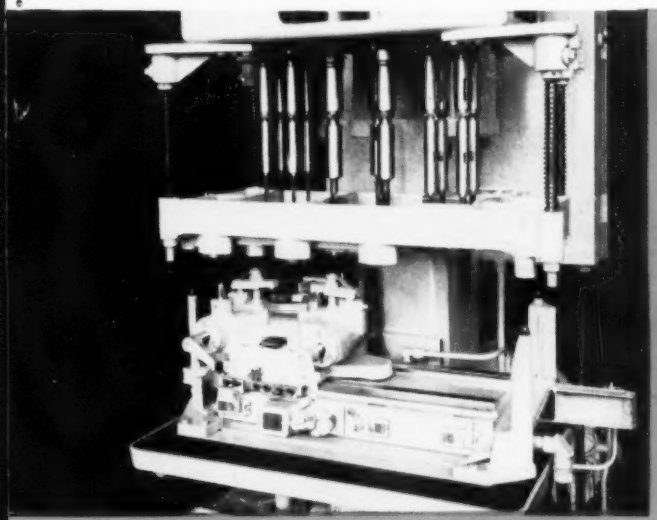
Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Grand Rapids Harrison • Houston • Indianapolis • Los Angeles • Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.

Natco Naturals

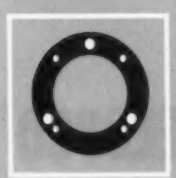
Cost-Cutting Ways
You Can Use
Standard Multi-Spindle Natcos

Any time your parts require machining *more than one hole*–drill, bore, face or tap–it may well be a "Natco Natural." Your standard Natco will produce substantial savings in a surprising number of situations, *even in small job-shop lots!* Call in your nearby Natco field engineer; he'll tell you in short order whether you've got a "Natco Natural" there.

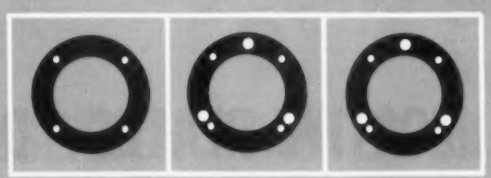


Multiple Drilling Operations on One Part-Face

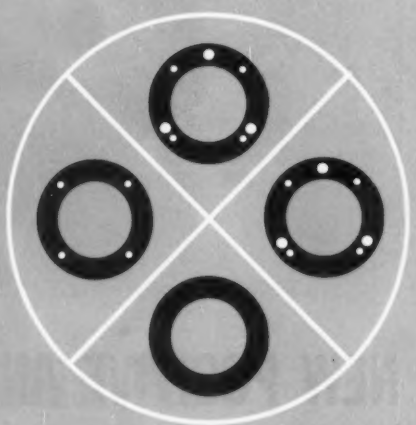
Straight-line indexing *on a Natco H6 produces 49 parts per hour. 4 holes drilled in first position, 3 holes drilled in second position, 4 holes c'bored in third position. One part completed every three strokes. Automatic cycling frees operator for other work. Illustrations below show three other ways of handling this part.*



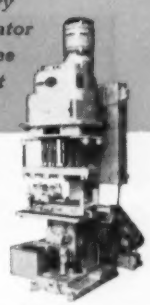
45 parts per hour. *Inexpensive box jig. Operator positions jig under appropriate spindles. One complete part for 3 strokes of machine.*



75 parts per hour. *3-position fixture. Operator shifts parts after each stroke. One part completed every stroke.*



155 parts per hour. *Rotary 4-position index table. Operator unloads and loads while three operations proceed. One part completed every stroke.*



Standard multi-spindle Natcos *range from 1 hp, 10-spindle machines to 25 hp machines with up to 72 spindles. Spindles in standard Natcos are driven through universal joints and located by either adjustable arms or bored slip plates.*

NATCO

National Automatic Tool Company, Inc.

Richmond, Indiana

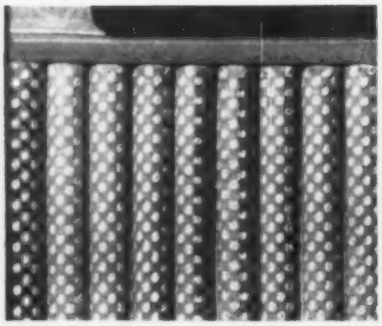
Multi-spindle drilling, boring, facing & tapping machines. Special machines for automatic production.

Call Natco Offices in Chicago, Detroit, New York, Buffalo, Boston, Philadelphia, Cleveland, Los Angeles; distributors in other cities.

Get more work from your

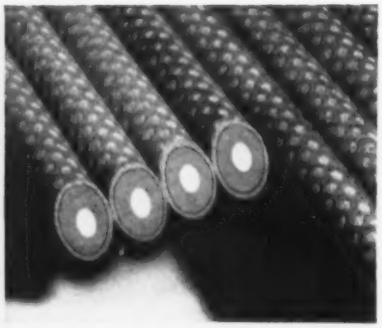
NEW TG EXIDE-

NEW POSITIVE AND NEGATIVE PLATES – DEVELOPED



New tubular construction of positive plate! Armored porous tubing. Provides resistance to corrosion and effects of vibration, improved flexibility, and maximum retention of active material. Thousands of tiny openings mean...

Greater porosity. Highly permeable tubes ease current flow, reduce internal resistance, improve access of electrolyte. Battery will deliver more power to meet sudden heavy loads. Tubes hold ...



More active material. Chief source of battery power. Larger inside diameter of tubes means every positive plate contains more active material per cubic inch of plate. And for maximum capacity and long life, there's a ...

electric industrial trucks

IRONCLAD BATTERY

Want more work hours—no increase in battery size? You get 44% more capacity in the new TG Exide-Ironclad Battery. For example, you can replace a 500 ah battery with a 720—in the same size. This means your trucks can do more work. They can earn a great deal more on your investment in them.

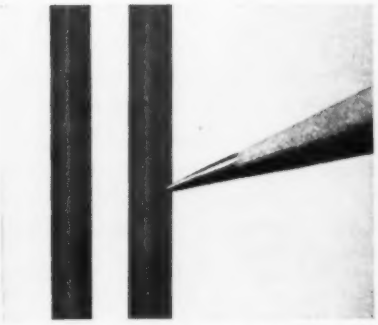
Satisfied with the work capacity of your present battery? Then get it at the lowest cost to own and operate—and get the newest, most advanced electric industrial truck on the market today.

Packs 44% more power into same battery space . . . priced to give you even greater battery economy

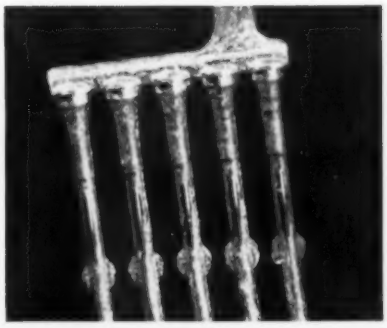
Want even lower operating cost and improved performance from your electric industrial trucks? Here Exide makes it possible. The new TG Exide-Ironclad Battery combines challenging new materials with an ingenious overall new design to produce the highest capacity per cubic inch of any battery available today. It's the most dramatic increase in capacity and the biggest step forward in power per dollar in history. This new battery can benefit every user of electric industrial trucks.

Learn more about the operating and expense advantages. Call your nearby regional Exide representative. Or write for complete information. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 1, Pa.

OUT OF RESEARCH STARTED 15 YEARS AGO



Thicker negative plate. Specially designed to match the increased capacity of the new positive plates. Plate is both thicker and stronger and possesses better electrical characteristics. You get all these advantages . . .



Plus Silvium,* Exide's exclusive grid alloy—proved more corrosion resistant than other leading grid alloys. Silvium is a patented combination of metals designed to prolong battery life. **U. S. patent*

Exide®

The Electric Storage Battery Company

Next—pilots will watch their own landings on TV!

Up from pitch-dark airfields come light signals invisible to the human eye . . . A new electronic "cat eye" in the cockpit amplifies these signals to produce daylight pictures of the ground on the pilot's television screen.

Thus, in blackout or encased in radiation-proof cockpits, tomorrow's pilots will guide their planes in to safe landings by this latest triumph of electronics.

Like the electronic age itself, the fabulous "cat eye" depends for its operation on the very best of electrical insulations—the kind CDF has been manufacturing for over sixty years.

FOR SPECIFIC INFORMATION on CDF products, see Sweet's, Electronics Buyers' Guide, and other directories. Then send us your print or your problem, and we'll return free samples and technical literature.

CDF MAKES Dilecto Laminated Plastics • Celoron Molded Plastics • Micabond Mica Products • Diamond Vulcanized Fibre • Flexible Tapes of Teflon*, Silicone, and Micabond • Resin-Impregnated Spiral Tubing • *Complete Fabrication Facilities.*

*duPont trademark for its tetrafluoroethylene resin

CONTINENTAL-DIAMOND FIBRE

A SUBSIDIARY OF THE BUDD COMPANY • NEWARK 85, DELAWARE

Universal collapsing tap parts of **MAX-EL** alloy steel finish machined after full heat treatment

Considerable machining is required in the manufacture of parts for these taps. That's why Crucible MAX-EL® 3½ free machining alloy steel was chosen by the Geometric Tool Company, Division of Greenfield Tap and Die Corporation. For with MAX-EL you can rough machine, *then* heat treat even intricate parts before final machining *with no danger of distortion of the steel.*

But the best way to check the advantages of MAX-EL is to try it in your own shop. Like many other users you'll appreciate its superior machinability, freedom from distortion, deep hardenability characteristics, uniformity and quality. And you'll like the longer tool life you get by using MAX-EL.

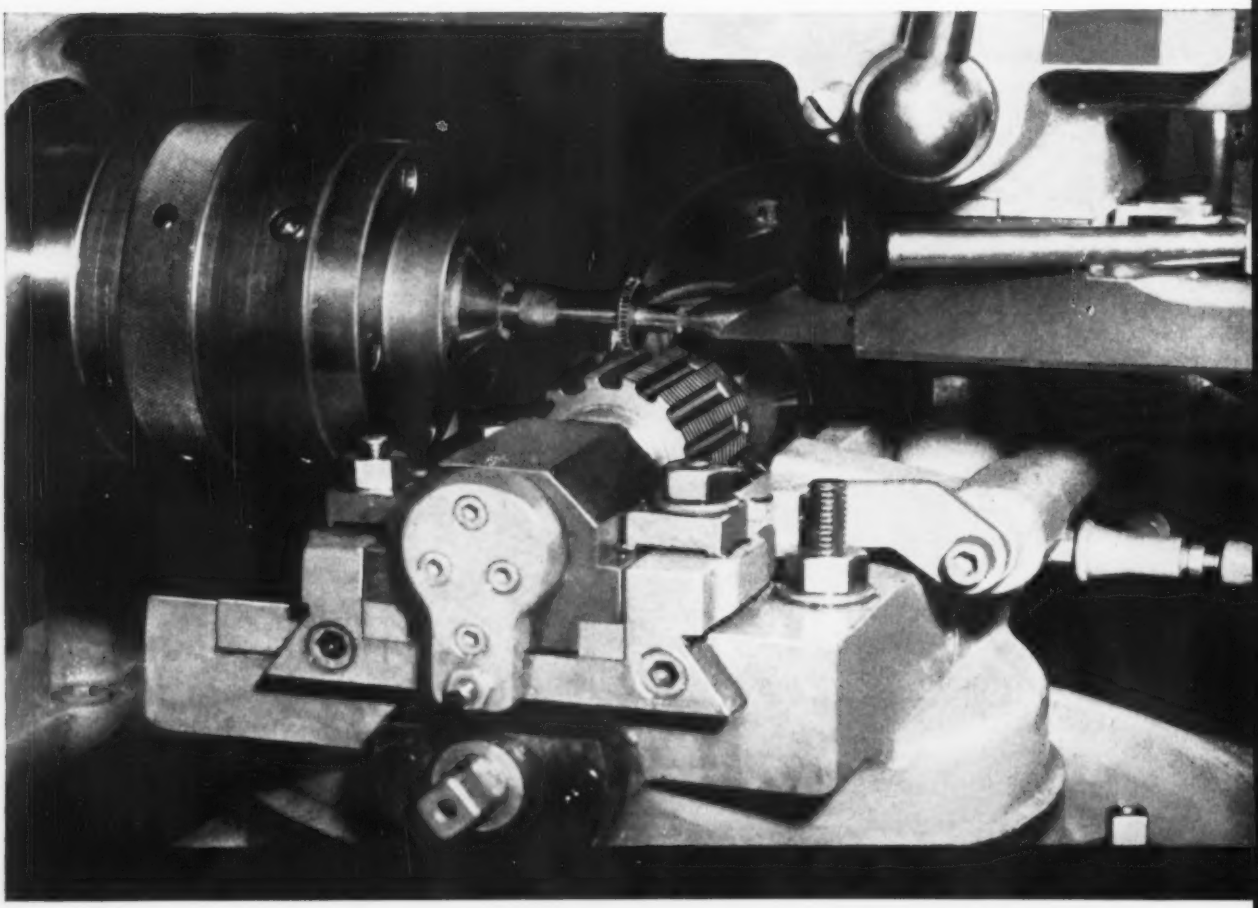
For complete data . . . and *quick delivery* of MAX-EL alloy steels, from local warehouse stocks, call *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

HOBBING PRECISION GEARS

within precision Class 2 AGMA tolerances.....



Fine-pitch instrument gears are cut on Barber-Colman Precision No. 6-10 Hobbing Machines at Belock Instrument Corporation. For their most accurate gears, Belock uses Barber-Colman Class AA hobs exclusively.

with standard-type precision hobbing machines

The Belock Instrument Corporation manufactures complex electronic and electromechanical systems and components. The constant demand placed on them for greater accuracy in these instruments requires all gears to be cut to very close tolerances and yet be completed on a practical production basis.

Belock hobs such gears consistently within Precision Class 2 AGMA tolerances, using a battery of *standard-type* Barber-Colman Precision No. 6-10 hobbing machines. These are unusually close tolerances and the use of *standard-type machines* for these gear accuracies is a good reason for taking a close look at the elements and methods they employ.

here's how they do it:

Gear blanks are machined to Precision AGMA tolerances. Then, for maximum accuracy in hobbing all precision gears, Barber-Colman Class AA single-thread ground hobs are used. These hobs are manufactured with tapered bores, since taper-bore hobs can, with greater ease, be mounted more accurately on the hob arbor to eliminate runout. These hobs are resharpened to original class AA accuracy using a Barber-Colman No. 6-5 Hob Sharpening Machine.

The gears are finish-hobbed on Barber-Colman Precision No. 6-10 Hobbing Machines. These machines hold a precision relationship between the rotation of the work and the rotation of the hob which allows them to consistently hob gears to these fine tolerances.

Barber-Colman Precision No. 6-10 Hobbing Machines are built with large precision index worm gears and single-thread worms for maximum tooth spacing accuracy. All vital machine parts are specially selected for close tolerances.

If you have a problem of producing consistent accuracy in gear cutting, consult Barber-Colman Hobbing Engineers for assistance. They can help you obtain any class of accuracy you desire with the most practical equipment for doing it.

this is an actual production record:

GEAR	HOB	OPERATION
Diametrical Pitch — 64	Class AA Ultra-Precision	Feed — .015"/rev.
Pressure Angle — 20°	2" Diameter, Taper Bore	Speed — 120 sfm
Outside Diameter — .7812"	Pieces per Sharpening — 720	
Pitch Diameter — .7500"	Stock Removal per Sharpening — .005"	
Face Width — .093"		
Material — 303 Stainless, 30-35 RC		

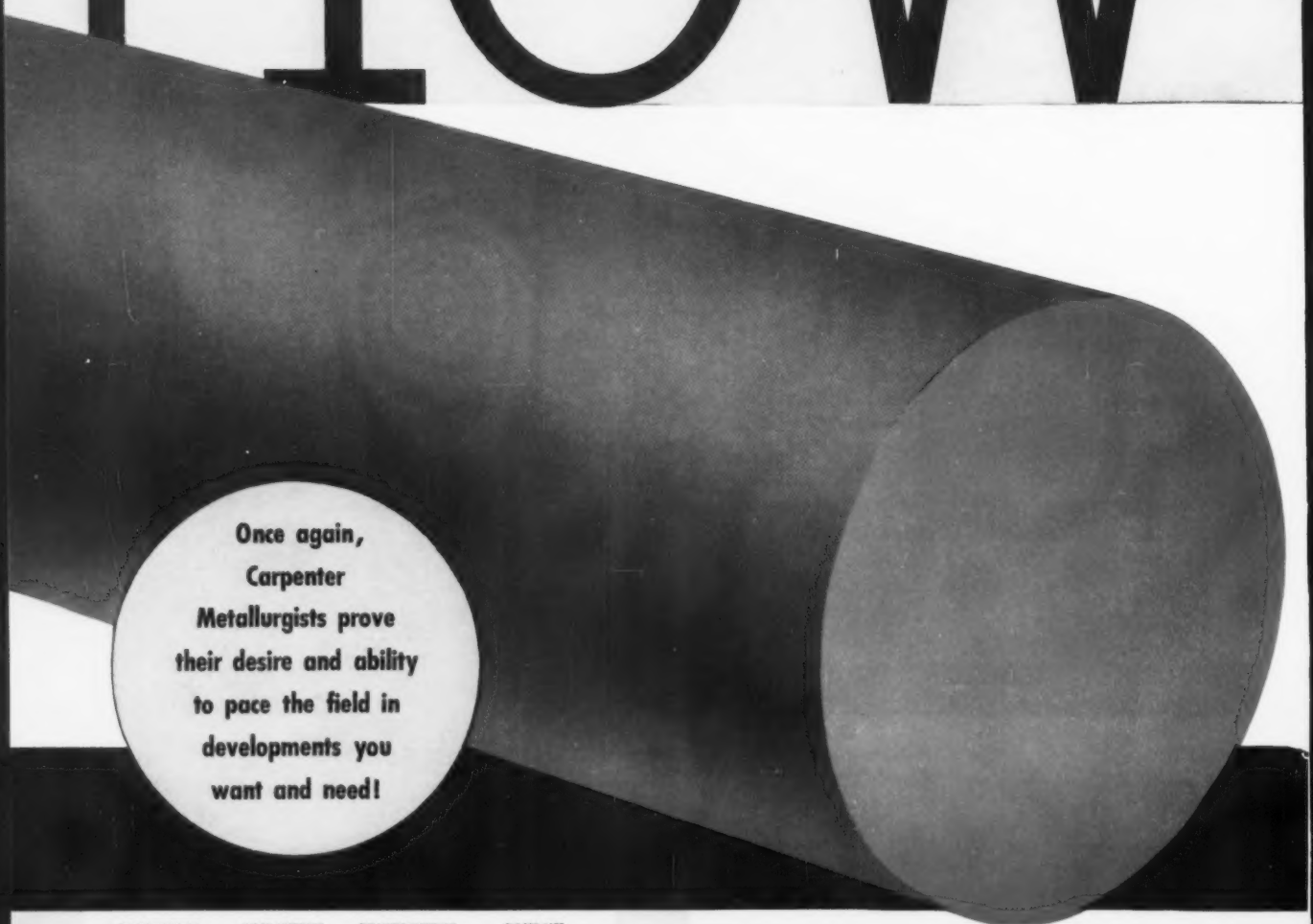
BARBER-COLMAN COMPANY

644 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines

BARBER COLMAN

now



Once again, Carpenter Metallurgists prove their desire and ability to pace the field in developments you want and need!

® *U.S. Patent Office*

Like all Carpenter Matched Tool and Die Steels every bar of STENTOR (Oil-Hard) is colored full length in its own distinctive color for quick, positive identification! Immediate availability from your local Carpenter Mill-Branch Warehouse, Office or Distributor.

...*Carpenter* extends the built-in safety factor of STENTOR (oil-hard) tool and die steel!

Remarkable heat treating versatility . . .
safe, dependable hardening through a broad range of 1425°F to 1525°F

The many advantages which make STENTOR one of industry's most used and talked-about steels are affected in no way by this exclusive new development. Its simplified analysis remains unchanged. It is still the *easiest* and one of the *safest* oil-hardening steels to harden. Requires no preheating whatsoever. Hardens from a lower temperature. Assures you less size change and distortion . . . uniform hardenability . . . full freedom from decarburization . . . long, dependable service.

And NOW . . . an extended Built-In Safety Factor enables you to heat treat STENTOR tools, dies and parts either of two ways: (1) At temperatures as low as 1425°F for the cost savings this brings you . . . or (2) Place them right in the furnace with other tools that are heat treated at temperatures up to 1525°F, and eliminate special furnace runs.

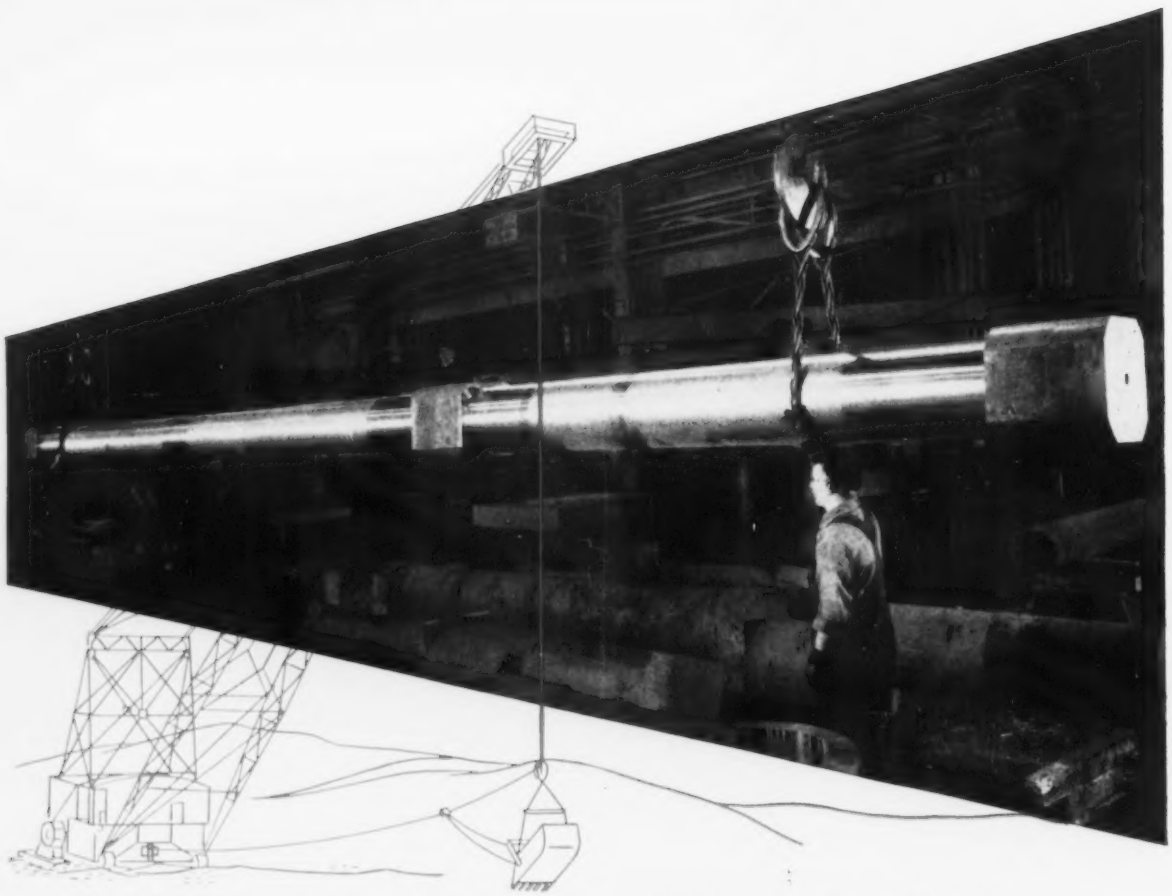
If you are not already using Carpenter STENTOR, it's time to *re-evaluate* the extra advantages you get with this versatile die steel.

JUST PRINTED! For more facts on how you and your men can Step Ahead with STENTOR, drop us a line on your Company letterhead for this new descriptive folder.

Carpenter STEEL

Matched Tool and Die Steels

The Carpenter Steel Company, 121 W. Bern St., Reading, Pa.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"



SAVE MONEY with FINKL FORGINGS

Manufacturers of earth moving equipment do!

• DIE BLOCKS • HOT WORK STEELS • FORGINGS • ELECTRIC FURNACE STEELS

Walking draglines are ingenious, mobile monsters employed for digging and moving earth. Because of their size and applications, often in isolated areas, they must be dependable and steady in their operations. Only the best materials and workmanship will prevent costly downtime in the field.

Many of these machines employ Finkl forgings. The 48 foot "walker" shaft shown above transfers power from the engine to the walking mechanism of the dragline to move as much as 450 tons of equipment. Here the best materials and craftsmanship will prove the least expensive in the long run.

For over 78 years, Finkl has produced the best in cylinders, spindles, driveshafts, and special forgings both rough turned and finish machined. When you are considering forgings or die blocks, call your local Finkl representative.

A. Finkl & Sons Co.

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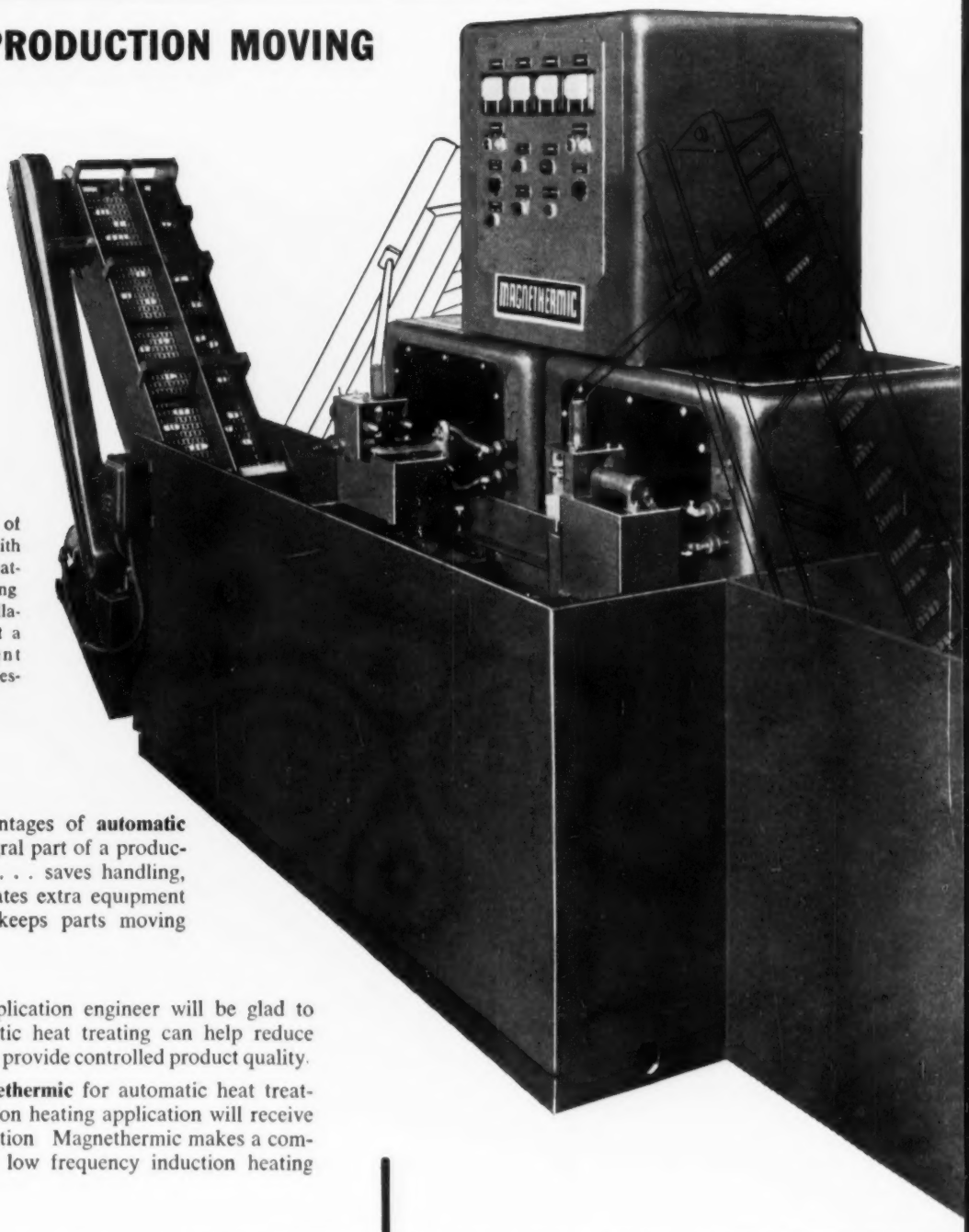
AUTOMATIC HEAT TREATING

with Magnethermic Induction Heaters

KEEPS PRODUCTION MOVING



Here is another example of automatic heat treating with Magnethermic Induction Heaters and automatic feeding This Magnethermic installation keeps parts moving at a steady rate to subsequent operations. Loading is necessary only once per shift.

You know the advantages of **automatic heat treating** as an integral part of a production or machining line . . . saves handling, controls quality, eliminates extra equipment and, most important, keeps parts moving continuously.

A Magnethermic application engineer will be glad to show you how automatic heat treating can help reduce manufacturing costs and provide controlled product quality.

An inquiry to Magnethermic for automatic heat treating or any other induction heating application will receive prompt, intelligent attention Magnethermic makes a complete line of high and low frequency induction heating equipment.

see MAGNETHERMIC for Induction Heating

INDUCTION HEATING EQUIPMENT

MAGNETHERMIC®
corporation
3990 SIMON ROAD YOUNGSTOWN 7, OHIO

longer life...

One of the unseen extra values you get in every

NATIONAL ROLL

If you are getting only *average* tonnage life from your rolls when a different metallurgical composition would give you *longer than average* tonnage life, let our metallurgists study your problem. They may be able to recommend rolls that will result in considerable savings through reduced down time and longer intervals between roll changes.

The fact that so many long-established steel companies are users of National rolls, and have been users for almost 50 years, is proof of their ability to give long tonnage life . . . and now, to produce even better rolls, National has the additional facilities and metallurgical experience of General Steel Castings Corporation, of which National is a division.

So next time you are ordering rolls—iron or steel—call on us for our recommendations.

NATIONAL ROLLS

GENERAL STEEL CASTINGS CORPORATION

NATIONAL ROLL & FOUNDRY DIVISION

Avonmore (Westmoreland County) Pennsylvania

General Steel Castings Corporation: General Offices, Granite City, Ill. • Plants: Granite City, Ill.—Eddystone, Pa.—Avonmore, Pa.

it's **easy** now
to recognize
superior quality

brass and aluminum

bearing this **new** trademark identification

made better
to bring out the BEST
in your products

SCOVILL

MANUFACTURING COMPANY
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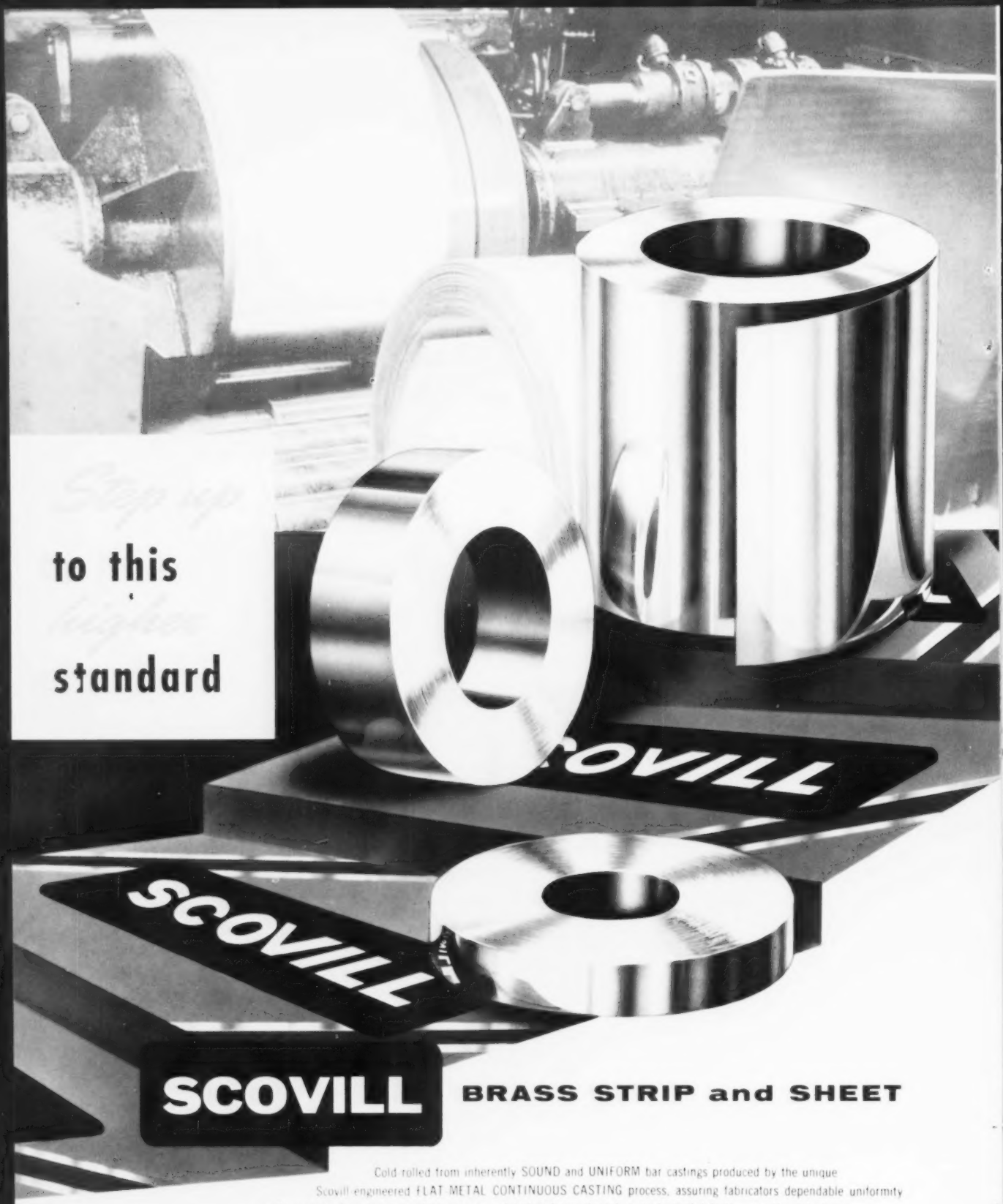

SCOVILL BRASS STRIP and SHEET

Cold rolled from inherently SOUND and UNIFORM bar castings produced by the unique Scovill engineered FLAT-METAL CONTINUOUS CASTING process, assuring fabricators dependable uniformity in alloy composition, temper and grain size . . . freedom from internal or mechanical defects . . . in the industry's longest weld-free coils when needed . . . with rapid deliveries from fast production cycles. These and many other Scovill PLUS VALUES, including new modern packaging, are designed to

bring out the BEST in your fabricated products

Scovill Manufacturing Company, Mill Products Division, 99 Mill Street, Waterbury 20, Connecticut. Phone Plaza 4-1171

YOUR GUIDE TO COLUMBIA HOT WORK TOOL STEEL GRADES

TYPE AND GRADES	DESCRIPTION	HARDENING RANGE	QUENCH	TEMPERING RANGE	USEFUL HARDNESS
T1 — CLARITE HW	Full tungsten hot work steel with modified carbon and vanadium for highest resistance to softening at elevated temperatures with best wear resistance and medium toughness.	2100° F. to 2250° F.	Oil or Salt Bath	1050° F. to 1250° F.	58/52 Rc
H24 — FORMITE NO. 3	A high tungsten hot work steel with good heat resistance to softening and wear, good toughness.	2000° F. to 2200° F.	Oil or Air	1050° F. to 1250° F.	56/48 Rc
H21 — FORMITE NO. 2	Reduced tungsten hot work steel with good resistance to softening and wear and high toughness.	2000° F. to 2200° F.	Oil or Air	1100° F. to 1250° F.	54/42 Rc
M10 — MOLITE HW10	A high molybdenum 2% vanadium steel with modified carbon for high resistance to softening and good wear resistance with high toughness.	1800° F. to 2100° F.	Oil or Air	1100° F. to 1250° F.	56/48 Rc
H13 — VANADIUM FIREDIE	Air hardening chromium molybdenum 1% vanadium for die casting aluminum, may be water cooled.	1825° F. to 1900° F.	Air	1000° F. to 1200° F.	52/38 Rc
H12 — ALCODIE	Chromium molybdenum tungsten vanadium air hardening hot work steel, resists softening with good resistance to wear and heat checking	1825° F. to 1875° F.	Air	1000° F. to 1200° F.	52/38 Rc
H11 — FIREDIE	Chromium molybdenum with 1/2 % vanadium air hardening type with widest range of uses, good resistance to softening and wear with high toughness and may be water cooled.	1800° F. to 1850° F.	Air	1000° F. to 1200° F.	52/38 Rc

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILLINOIS

CENTRAL OFFICE AND WORKS, CHICAGO HEIGHTS, ILLINOIS — BRANCH STOCKS IN THE FOLLOWING CITIES:

1957

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Cincinnati 25 — 2716 Spring Grove Ave. — Phone MUlberry 1-8400
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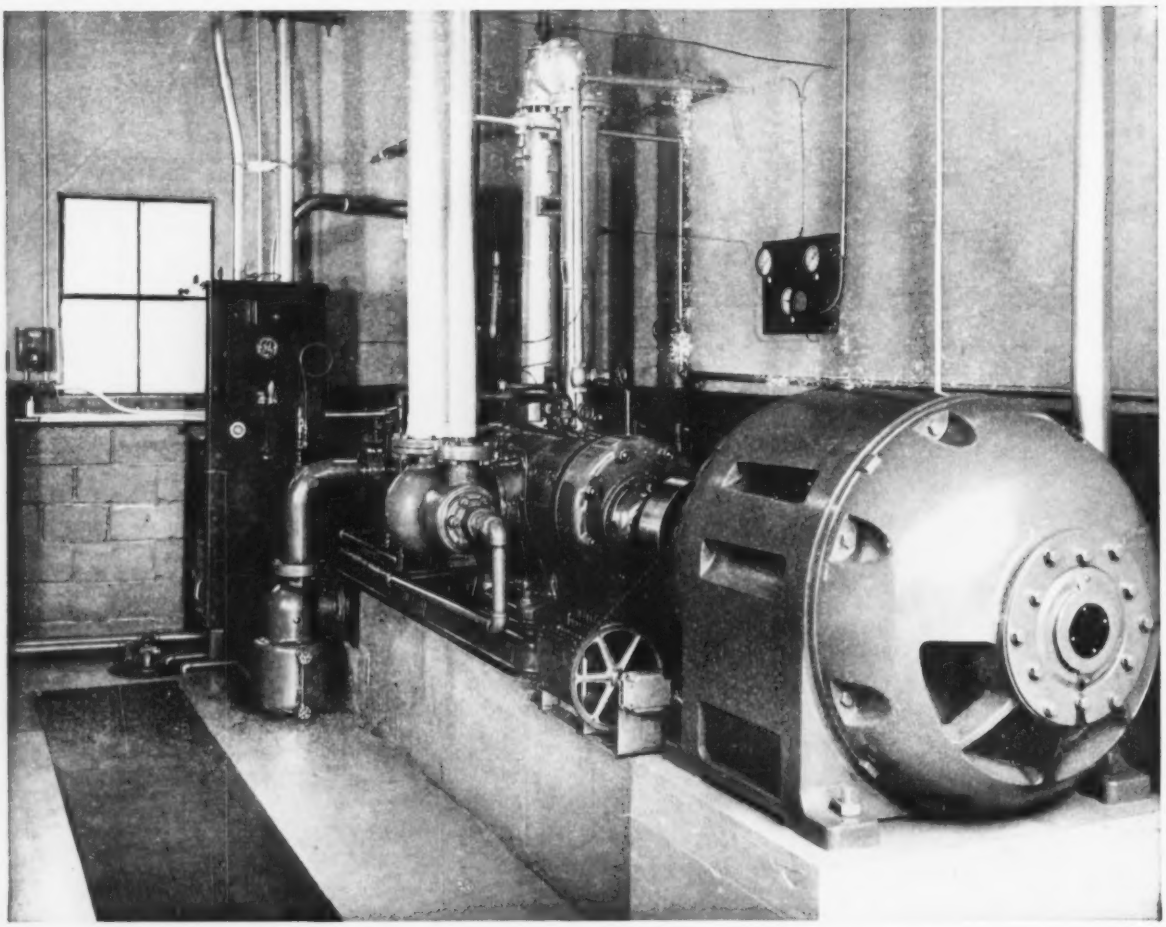
Detroit 3 — 121 Oakman Blvd. — Phone TUlsa 3-3770
Los Angeles 22 — 6955 E. Bandini Blvd. — Phone RAymond 3-4684
Milwaukee 4 — 426 S. Sixth St. — Phone BRoadway 6-0255
St. Louis 13 — 5118 Easton Ave. — Phone FOrest 1-0641

REPRESENTATIVES IN THE FOLLOWING CITIES: Dayton, Erie, Grand Rapids, Hartford, Indianapolis, Louisville, Moline, Newark, Portland and St. Paul

TOOL COLUMBIA STEELS

COLUMBIA TOOL STEELS

DIE STEELS: Superdie — Atmodie — E-Z-Die Smoothcut — Exl-Die — CEC Smoothcut CARBON TOOL STEELS: Columbia Special — Vanadium Extra — Waterdie Extra — Columbia Extra — Columbia Extra Headerdie — Vanadium Standard — Colmbia Standard HIGH SPEED STEELS: Clarite — Vanite — Acmite — Cobite — Maxite — Molite Smoothcut — Molite #3



Fuller Rotary Two-Stage Compressor, C135-135H. Capacity 680 c.f.m., 100-lb. pressure, 690 r.p.m., 150 hp. motor.

16,000 HOURS OF OPERATION WITH NO MAINTENANCE

Empire Steel Castings, Inc., Reading, Pennsylvania, installed a C-135-135H Fuller Rotary Two-stage Compressor in April 1953. After 32 months—approximately 16,000 hours of operation—the compressor received a routine inspection, when a new set of blades was installed in the higher-pressure cylinder.

The Empire engineers report no downtime since replacement, although they've added 4,000 operating hours. Prior to switching to Fuller, their former experience with compressors was a different story—as many as several overhaulings in one year. With Fuller equipment furnishing a constant high capacity air supply, production costs have been greatly reduced.

Here's how Empire uses compressed air:

- In the molding department, supplying all air for pneumatic rammers, all squeeze and jolt machines, automatic set-out and lifting apparatus of mold conveyors, automatic shake-out machines, mold cleaning and spraying equipment.
- In the core department, for ramming equipment, spraying and torch drying equipment, core oven operation as well as core blowing equipment.
- In the cleaning department, pneumatic chipping hammers and grinders, blacksmith requirements, sand-blasting, pressure testing and miscellaneous tools.
- In the heat-treating department, heat treating furnace operation and cooling equipment.

To get all the facts and engineering data, write today for Bulletin C-5A.

C-298
3662

Visit us in Booth 717 at the National Materials Handling Exposition, Philadelphia, April 29 to May 3

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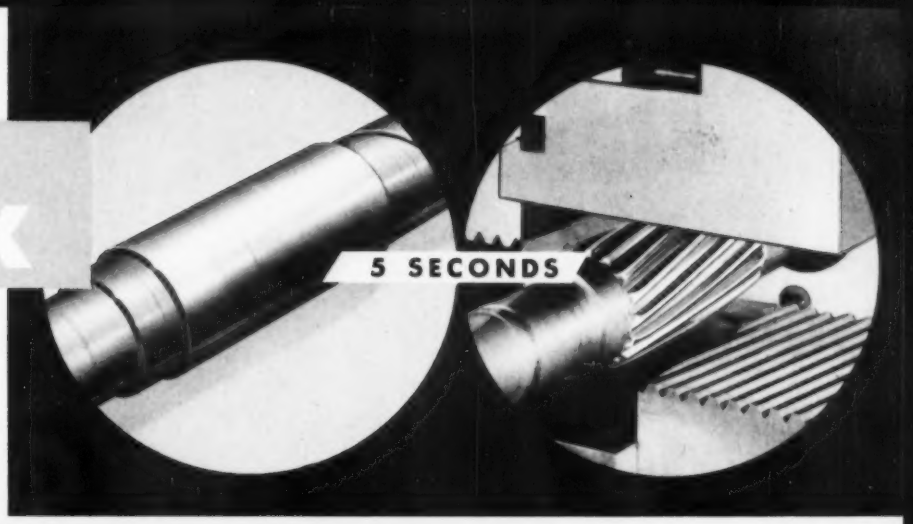
Fuller

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

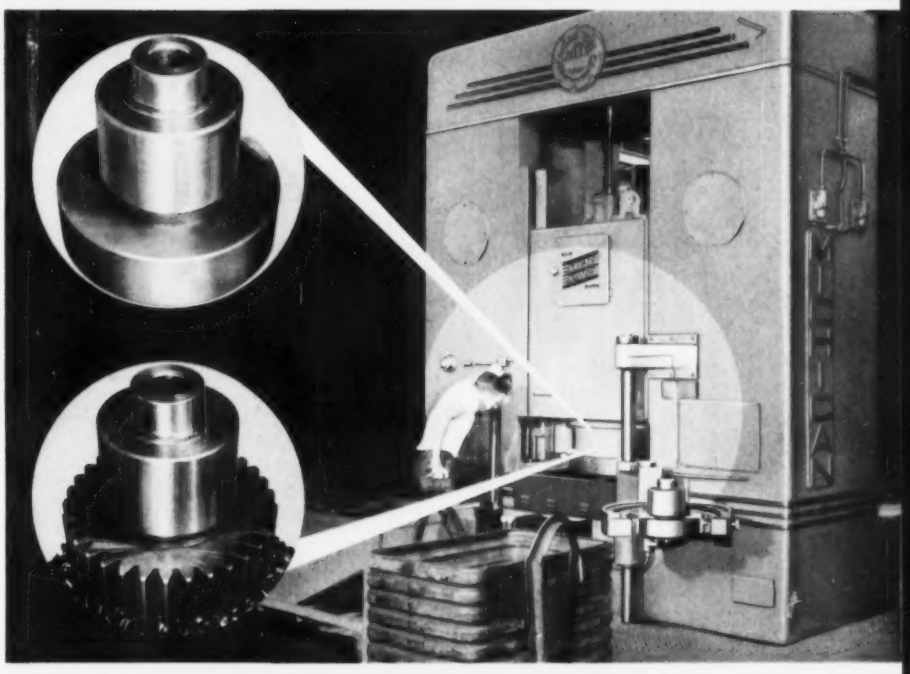
This Month's

GEAR PIX



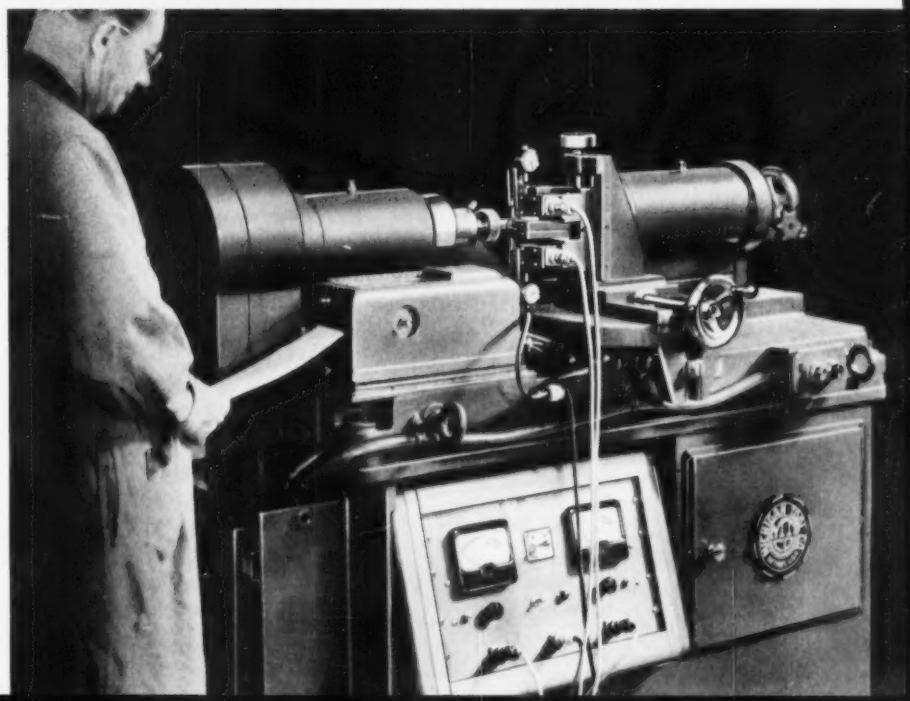
SPLINE ROLLING IN ONLY 5 SECONDS . . .

. . . That's all it takes to roll-form this helical spline with the Michigan Roto-Flo "chipless production" process. Floor-to-floor time, with automatic loading, is 17 seconds. Cold metal displacement produces required dimensions from blank diameters less than the PD and OD. As accurate as machining, the process produces superior surface finishes. Want more data? Just ask for our application Bulletin RF-55.



GEARS FOR ROADBUILDING EQUIPMENT . . .

. . . are readily cut on this automatically cycled Michigan Shear-Speed. The heavy 33-tooth gear shown (3¾-in. face width) is produced at 5½ pieces per hour, removing over 10 lbs. of SAE 8622 steel as chips. Cutting speed is 17 fpm. Let us send you Bulletin SS-55 telling the full story of large gear shaping.



AUTOMATIC CHECKER FOR HIGH PRECISION GEARS . . .

. . . designed particularly for aircraft and special-purpose spur gears. Cuts time needed for checking and recording parallelism, tooth taper and tooth spacing to 16% of normal. Handles gears from ¼ to 2½-inch face width and up to 14 inches diameter. Readings are automatically and permanently recorded by a built-in recorder for easy comparison. Ask for Bulletin 481-A.

MICHIGAN TOOL COMPANY

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IN CANADA: COLONIAL TOOL CO., LTD.

This Month's

GEAR PIX

AUTOMATIC LOADING UPS GEAR SHAVING OUTPUT . . .

. . . and releases the operator for preliminary gear checking. Mechanical loaders on standard machine tools (shown here: a Michigan Gear Shaver) offer a middle ground of automation that pays off immediately in output per machine-hour without increasing the work load of the operator. It's also safer.

READY SOON— A TANDEM HOBBER . . .

. . . latest addition to the Michigan line of hobbers features self-contained checker, automatic size control, loading and unloading, and chip disposal. You'll be able to set two or more of these hobbers in series for continuous through-feeding of parts. Literature coming off press soon—drop us a line now.

FROM RESEARCH— BETTER MACHINES, BETTER GEARS . . .

. . . Michigan machines and tools of tomorrow—for the controlled-quality, easier-made gears and splines to come—will owe much to the work of our research staff. This stepped-up development activity, now housed in new facilities (one section of which is shown), will carry on the scientific study basic to gear progress. New methods, machines and tools are sometimes the best answer to requirements of a particular manufacturer. If you have a problem in the area of gear and spline production, we will be glad to talk it over.

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS RD. • DETROIT 12, MICH.
IN CANADA: COLONIAL TOOL CO., LTD.

Steaming humidity—death to metals—can't penetrate RUST VETO

Protection against rust, indoors and out, is a world-wide problem . . . and Houghton has been solving such problems for 87 years. Whether the job is protecting military equipment on a steaming South Pacific island or preventing rust loss for a machine shop in New England, Houghton products have become the standards of excellence.

Rust Veto 344, for example, provides long-lasting outdoor protection. A single application is all that's needed, and this general-purpose rust preventive gives you these advantages:

- Fast drying—handle it in 4 hours
- Tough, thin (.003") film is rosin-free
- Won't harden, crack, or peel
- Easily removed with solvent-soaked cloth
- Safely withstands 100° humidity

There's a Rust Veto designed expressly for your corrosion problem. Ask your Houghton Man about the complete line or write direct to E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Penna.

RUST VETO . . . a product of

For your tool room . . .
Handy Aerosol cans of
RUST VETO SPRAY.
Ask the Houghton Man

E. F. HOUGHTON & CO.
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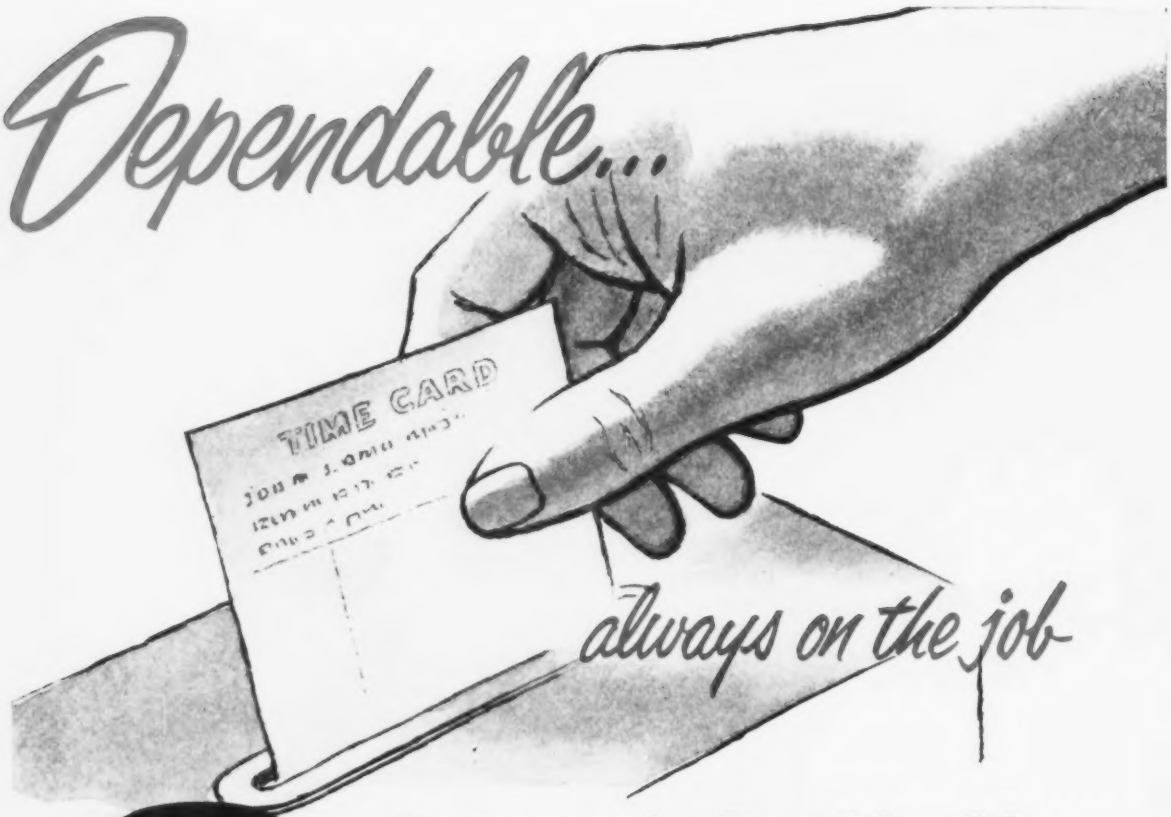
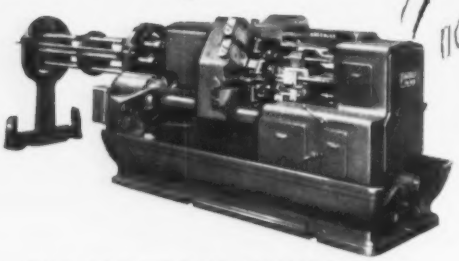
Ready to give you on-the-job service . . .



PRODUCTION MACHINERY

GREENLEE Automatic Bar Machines



SIX AND FOUR-SPINDLE AUTOMATIC BAR MACHINES

GREENLEE Special Machine Tools

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Hydro-Borer Precision Boring Machines

BOOST PRODUCTION REDUCE DOWN TIME

It's easy to maintain rigid production schedules . . . prevent costly bottlenecks with Greenlee Bar Automatics. They are always on the job . . . give continuous, reliable service.

You hear much comment about Greenlees' uninterrupted, round-the-clock performance in widely different industries. With good reason, too, for Greenlee offers years of manufacturing experience... plus manufacturing integrity not often duplicated.

Want complete information? Call in the Greenlee man. Let him give you the complete story. Please submit a print when inquiring about a specific job.

WRITE FOR CATALOG No. A-405

GREENLEE BROS. & CO.

1804 MASON AVENUE
ROCKFORD, ILLINOIS

Photo courtesy of Jones & Laughlin Steel Corporation

BAKER'S MAGDOLITE AND JEBCOLITE
are always 5 ways better

Continued research and development throughout the years, plus The J. E. Baker Company's precisely controlled manufacturing methods, have resulted in the superior, properly burned, grain-sized Magdolite and Jebcolite particles which help provide:

More uniform ingots—increased ingot production—increased furnace efficiency—lower refractory costs—less defective production material.

Magdolite and Jebcolite* are the *original* dead-burned dolomites that offer better composition, preparation, strength, economy and quality. Don't say "dolomite." Save dollars. Specify Baker's Magdolite for open hearth and Jebcolite for electric furnace use.

** Jebcolite has the same superior chemical, physical and mineralogical characteristics as Magdolite and differs only in grain size which is designed specifically for electric furnace application.*

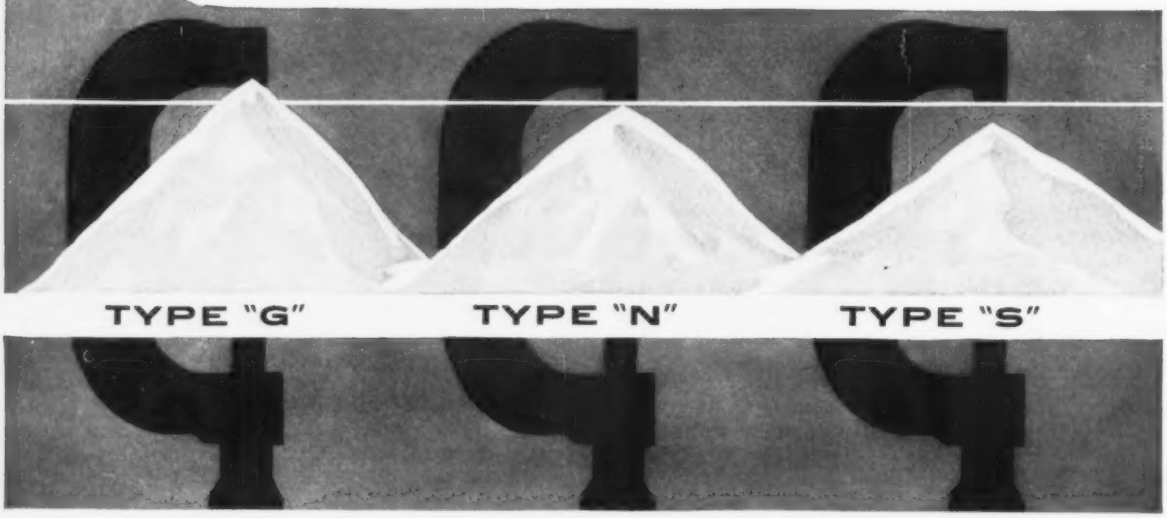
JEBCO
PRODUCTS
SINCE 1889

THE J. E. BAKER COMPANY
YORK, PENNSYLVANIA
PLANTS: BILLMEYER, YORK, PENNSYLVANIA — MILLERSVILLE, OHIO

Now in Production...

3 NEW REPUBLIC IRON POWDERS

...WITH Controlled dimensional factor



TYPE "G" TYPE "N" TYPE "S"

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

To meet the varied requirements of industry, Republic's Metal Powder Division has developed and is producing three new grades of iron powder suitable for the molding and manufacture of mechanical parts.

Each one of these new powders has a variable controlled characteristic known as *Controlled Dimensional Factor.* This term simply means that in the presence of copper, Republic Iron Powder—depending on type—can be made to grow, remain stable, or shrink, within acceptable limits. These new powders have been designated as:

TYPE "G" FOR GROWTH—A powder having a definite growth-characteristic in the presence of copper, and developed for use in many *existing* dies designed for powder which expands when sintered.

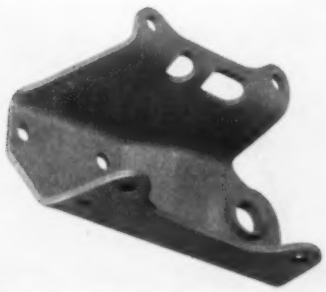
TYPE "N" FOR NORMAL—This powder has been given normal variation in dimensional change from a slight shrinkage to a slight growth, depending upon the end-result required.

TYPE "S" FOR SHRINKAGE—A powder with an extremely high shrinkage-characteristic which can be used to attain certain tensile strengths with lesser quantities of copper.

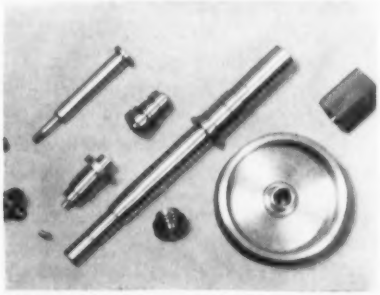
Both "S" and "N" powders should prove exceptionally advantageous to parts producers faced with the problem of what to do with dies that have become oversize through wear. Types "S" and "N" make possible the production of parts to original dimensions without the need for extensive or expensive re-working of dies.

Controlled Dimensional Factor is an exclusive Republic development retaining the excellent chemistry and high green strength always associated with Republic Iron Powder.

For complete information on chemical composition, physical properties and test evaluations, write for Republic Booklet Adv. 763.



PRODUCTION FACILITIES, plus complete design and engineering service, go to work for you as an extension of your plant, when you have stamped and drawn parts fabricated by Republic's Pressed Steel Division. One example of a wide variety of steel parts mass-produced to specification, at the lowest possible cost, is the truck-shaft bracket shown above. Write for Booklet Adv. 681.



PRODUCTION OF PRECISION PARTS at higher speeds and feeds with fine finished surfaces and longer tool life, is made possible by the use of Republic Cold Finished Steels. Republic offers you a complete range of carbon, alloy, and stainless analyses drawn to precise size and cross section. Mail the coupon today for complete information on Republic Cold Finished Steels.

PRODUCTION OF BUILT-UP, INTERLOCKING OR ASSOCIATED PARTS is greatly simplified by the use of Republic Cold Drawn Special Sections. Machining time and costs are reduced to a minimum because the sections are preformed to the predominating cross section of the part. Cold drawing also improves physical properties in the parts. Available in all grades of carbon, alloy and stainless steel. Send coupon for more data.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-3467
3104 East 45th St., Cleveland 27, Ohio

Please send more information on these Republic products:
- ☐ Iron Powder (Booklet Adv. 763)
- ☐ Stampings (Booklet Adv. 681)
- ☐ Cold Finished Steels
- ☐ Special Sections

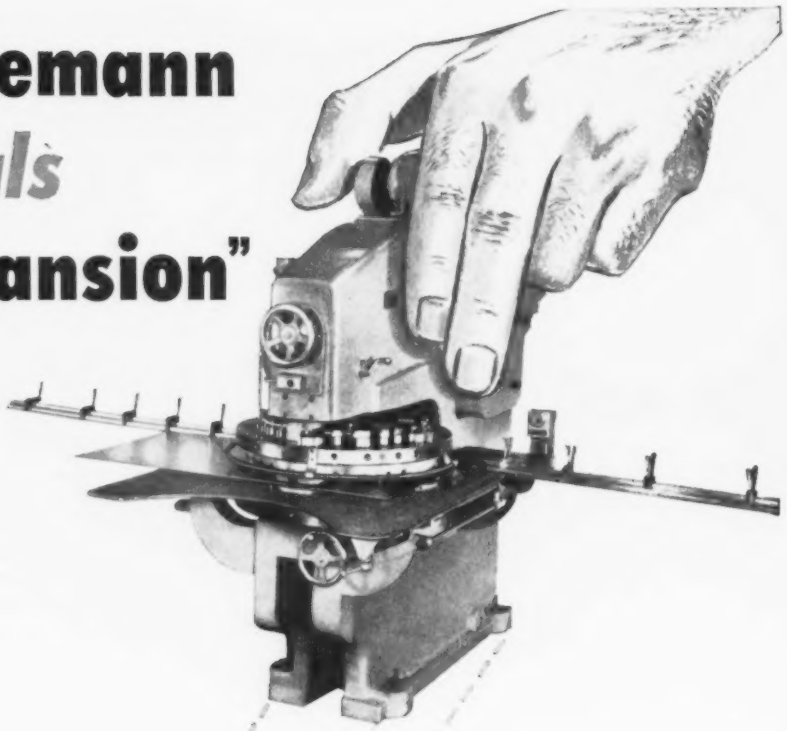
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

ONE Wiedemann *equals* Plant "Expansion"

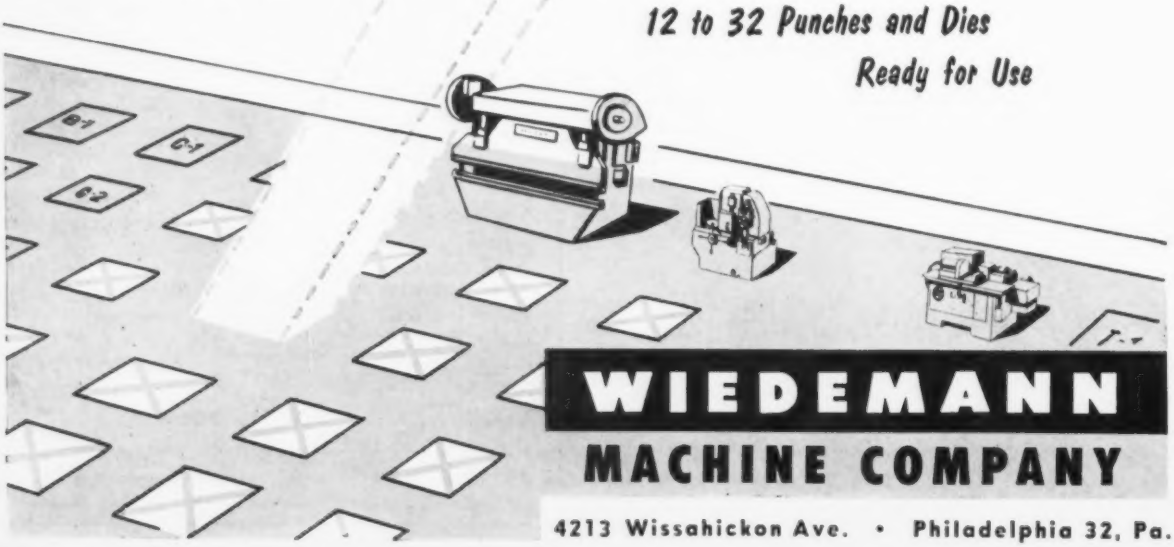


Exaggeration? Not if the experience of Wiedemann users is any criterion.

Wiedemann Turret Punch Presses produce more work in less time and in less space. In numerous plants, one Wiedemann has replaced as many as 12 or 14 units such as single purpose punch presses, layout tables, nibbling machines, etc. And in most cases, the single Wiedemann, in 1/10 the floor space, actually out-produces the multiplicity of conventional equipment. Direct savings of 60% to 90% are commonplace. Machine down-time is practically eliminated; accuracy is improved; valuable floor space is freed; engineering changes become low cost operations. . . .

If you are interested in greater productivity of pierced parts in small to semi-production quantities, such as panels, chassis, truck parts, etc., it will pay you to get the facts about Wiedemann Turret Punch Presses. Send drawings of your work for time study or write for Bulletin 201.

12 to 32 Punches and Dies Ready for Use



WIEDEMANN MACHINE COMPANY

4213 Wissahickon Ave. • Philadelphia 32, Pa.

Save by using specialized refractories

Many refractories problems in metal-working furnaces have been solved *economically* by the use of B&W specialized refractory castables. Each ferrous or non-ferrous furnace application requires a specific combination of properties to meet the service conditions. Whether your problem is high temperatures, abrasion and erosion, slag attack or the need for insulation, to name a few, you will find the refractory castable best suited to your requirements in B&W's line. Shown here in digest form are data on the widely used B&W refractory castables for metal-working furnaces:

B&W Refractory Castables for Metal Working Furnaces

	Temp. F	PROPERTIES	TYPICAL APPLICATIONS
B&W Kaocast	3000	**High resistance to spalling and slag attack. Low volume change and negligible reheat shrinkage.**	**Soaking pit covers, linings of high temperature heating and forging furnaces, burner blocks, electrode linings of electric furnace roofs, linings of non-ferrous metal furnaces.**
B&W Kaocrete 32	3200	High strength, exceptional refractoriness, unusual volume stability, excellent resistance to spalling.	Can be used in applications similar to those of B&W Kaocast and where higher refractoriness is required.
B&W Kaocrete D	2500	**Sufficient strength and hardness to withstand abrasion, considerable physical abuse and erosion.**	**Aluminum melting furnaces, linings and car tops in heat treating furnaces, as well as in sections of a wide variety of furnaces that are subject to scraping by hand tools or other mechanical abuse.**
B&W Kaocrete A	2600	Resists reducing atmospheres. Has good resistance to erosion, abrasion and thermal shock.	Annealing furnace bases and other applications where resistance to reducing atmospheres is essential. Also as a general purpose castable for linings in medium temperature service.
B&W Kaocrete B	2300	**Has an adhesive plastic texture particularly suited for vertical or overhanging constructions. Excellent for plastering.**	**Patching linings and baffles and for any application where plastering rather than gunning or casting is required.**
B&W Kaocrete LI	2700	High alumina content, exceptionally high strength for resistance to abrasion and erosion.	Aluminum furnace linings where high alumina content is important.
B&W Kaolite 20	2000	**Offers castable's fast, low cost installation plus insulation. Has refractoriness, light weight and low heat conductivity and, in addition, will resist reducing atmospheres. Can be poured or gunned.**	**Aluminum melting, heating and heat-treating, annealing and forge furnaces. Also for general maintenance and patching.**
B&W Kaolite 22	2200	**Has the same properties as B&W Kaolite 20. Can be used for higher temperatures but not in reducing atmospheres.**	

Send for your copy of B&W Bulletin R-35. It gives additional information on B&W's versatile refractory castables.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
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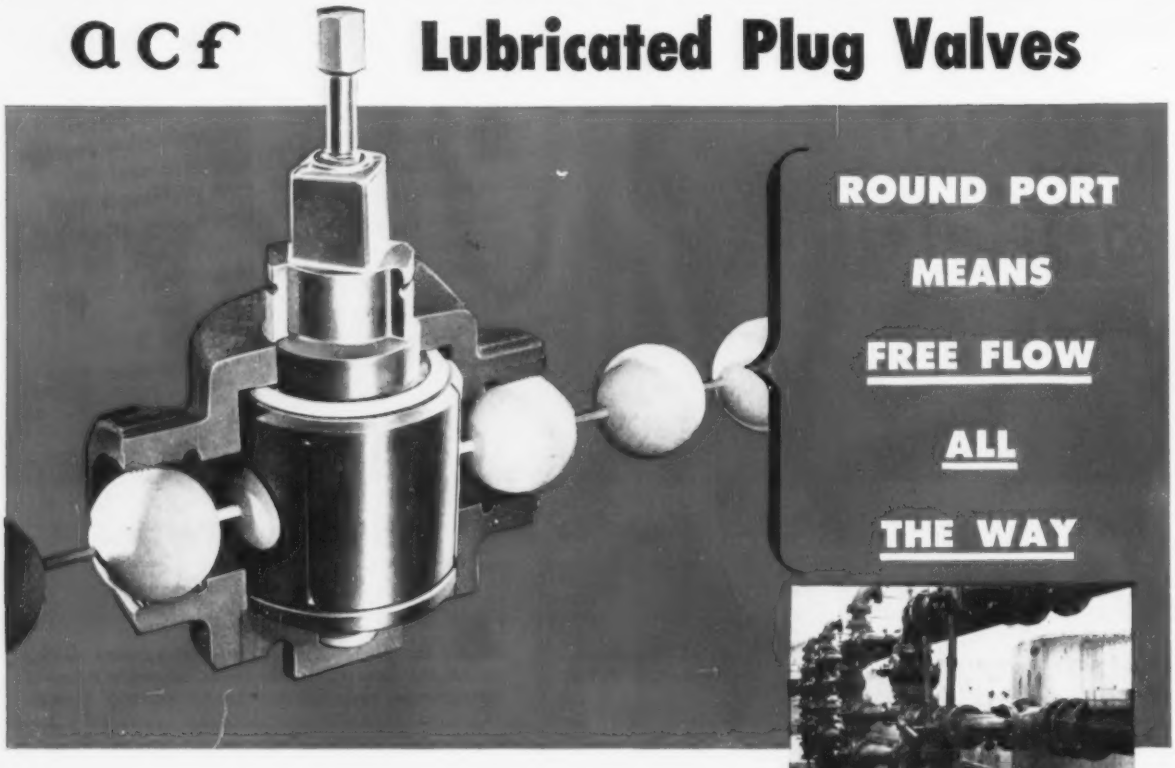
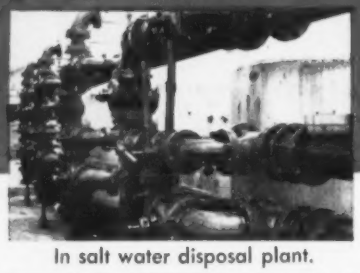
B&W

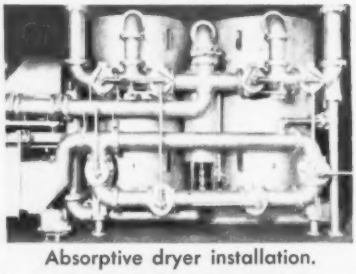
R561

acf Lubricated Plug Valves

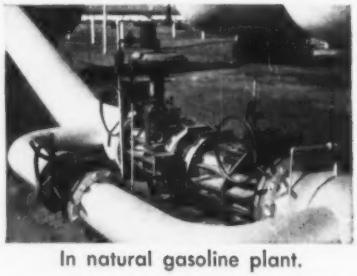




In salt water disposal plant.



Absorptive dryer installation.



In natural gasoline plant.

In oilfield service

You get full volume, unrestricted flow throughout the entire piping system when you use acf Round Port Valves.

The pipe-matching port openings cause no loss in head pressure—offer no more resistance to flow than the pipe itself. There are no obstructions—no turbulence and no harmful abrasive effects from solids in suspension. Even the most heavy viscous ladings flow freely through acf Round Port Valves.

Split-second quarter-turn shutoff, non-wedging cylindrical plug, Teflon* head gasket, are additional advantages that add to perfect performance of acf Round Port Valves—that mean extra long trouble-free service—lower maintenance costs and fewer work stoppages.

Act now to step up valve performance—to keep maintenance costs down. Representatives in 50 principal cities.

★ DUPONT TRADE NAME

W-K-M

DIVISION OF acf INDUSTRIES INCORPORATED

PLANT: MISSOURI CITY, TEXAS
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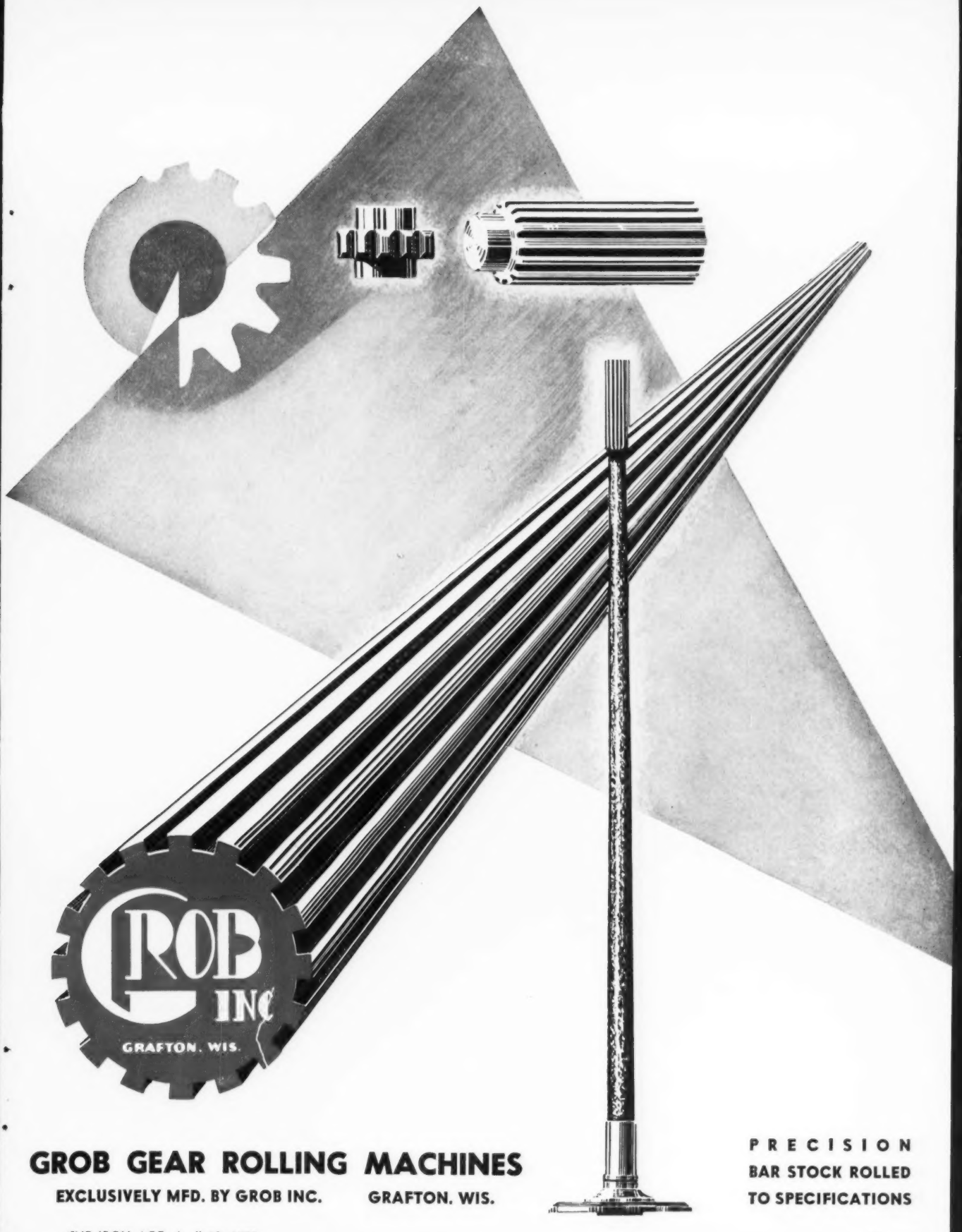
MANUFACTURERS OF

W-K-M	acf	KEY
THROUGH-CONDUIT GATE VALVES	LUBRICATED PLUG VALVES	RETURN BENDS AND FITTINGS



GROB GEAR ROLLING MACHINES

EXCLUSIVELY MFD. BY GROB INC. GRAFTON, WIS.

PRECISION BAR STOCK ROLLED TO SPECIFICATIONS

Tighter Coils For Better Springs

Co-owners Walter Pesaresi (left) and James Berg of Winamac Coil Spring examine coil of Pittsburgh Steel Oil Tempered Wire and a stock of coiled springs, ready for shipment.

Pittsburgh Steel's O. T. Wire Does Job For Winamac Coil Spring

When a spring-coiling job comes along so tough that many spring-makers dodge it, a satisfactory spring usually depends on combining human know-how with the right kind of quality steel wire.

A balance spring that supports the mower on a farm mowing machine presented such a problem recently to the Winamac Coil Spring Company in Winamac, Ind.

This is the story of how one man's knowledge of wire and spring-making produced a more than satisfactory spring on a difficult job.

The $16^{9}/_{16}$ inch long spring, coiled exceptionally tight and made of Pittsburgh Steel Company's Oil Tempered Wire, has 30 coils. Two and one-half coils at each end are passive. They hold a plug inserted by the farm implement manufacturer who buys the springs which support the weight of the mower on the tractor.

Springs often were rejected because of improper initial tension and burrs which interfered with insertion of plug ends.

Walter Pesaresi, co-owner and co-founder of Winamac Coil Spring Co. and a spring-maker all his life, credits three factors for his success in coiling the springs properly.

1. Selection of Pittsburgh Steel's Oil Tempered Wire.

2. Development of a new device which permitted tighter coiling.

3. Proper heat-treating techniques for stress-relieving the steel after coiling.

• **The Right Wire**—"Pittsburgh Steel's Oil Tempered Wire was a happy choice," said Mr. Pesaresi. "Its grain structure is right, it has a good surface, it's free from hard or soft spots and we can depend on it to hold uniformly to tensile strength specs."

• **Coiling Techniques**—Although Winamac Coil Spring has a hand-coiler matched by only three or four others in the country, Mr. Pesaresi found special techniques were needed to produce the balance spring with tight enough coils. To solve that problem, he designed and built a carriage and rollers that ride along the frame of the machine and guide wire on the mandrel. This device forces the wire being coiled tight against the wire just coiled. Exceptionally tight coils result.

• **Heat Treatment**—Coiling 21 feet

Balance spring is coiled on hand machine. It is equipped with a special carriage, designed and made at Winamac Coil Spring, which assures tight coiling.

Winamac uses other Pittsburgh wire than oil tempered. Here are tiny springs, made from music wire, for use in valves of Air Force oxygen masks.

Co-owner Walter Pesaresi examines finished balance spring, complete with plug which is inserted by customer who uses spring to support farm mower on tractor.

of .531 oil tempered wire into a 30-coil spring $16\frac{9}{16}$ inches long produces heavy stress in the wire.

That's why stress-relieving is necessary to impart exactly the proper physical characteristics.

In the mowing machine spring, stress relief is especially important. The spring is subjected to continuous flexing and must be capable of supporting widely varying shock loads throughout its full range of adjustments.

After study and experimentation, Mr. Pesaresi found stress relieving coiled springs for $2\frac{1}{2}$ hours at 500 degrees Fahrenheit provided just the right combination of time and temperature to give the springs long life in service.

• **Dependability**—Winamac Coil Spring has come to depend on Pittsburgh Steel for more than oil tempered wire.

Winamac uses music wire, supplied by the Johnson Steel & Wire Company subsidiary in Worcester, Mass., for automotive springs, appliance applications and for such uses as a valve spring for an Air Force oxygen mask. (Photo at left.)

"We found from actual experience," said Mr. Pesaresi, "that Johnson music wire was the only wire that held its dimensions uniformly."

Whether your operations call for oil tempered wire, some other type of manufacturers wire, or a fine wire specialty like Johnson's music wire, you'll find what you want at Pittsburgh Steel.

The fine, consistent quality of Pittsburgh wire holds down your production costs and builds customer satisfaction.

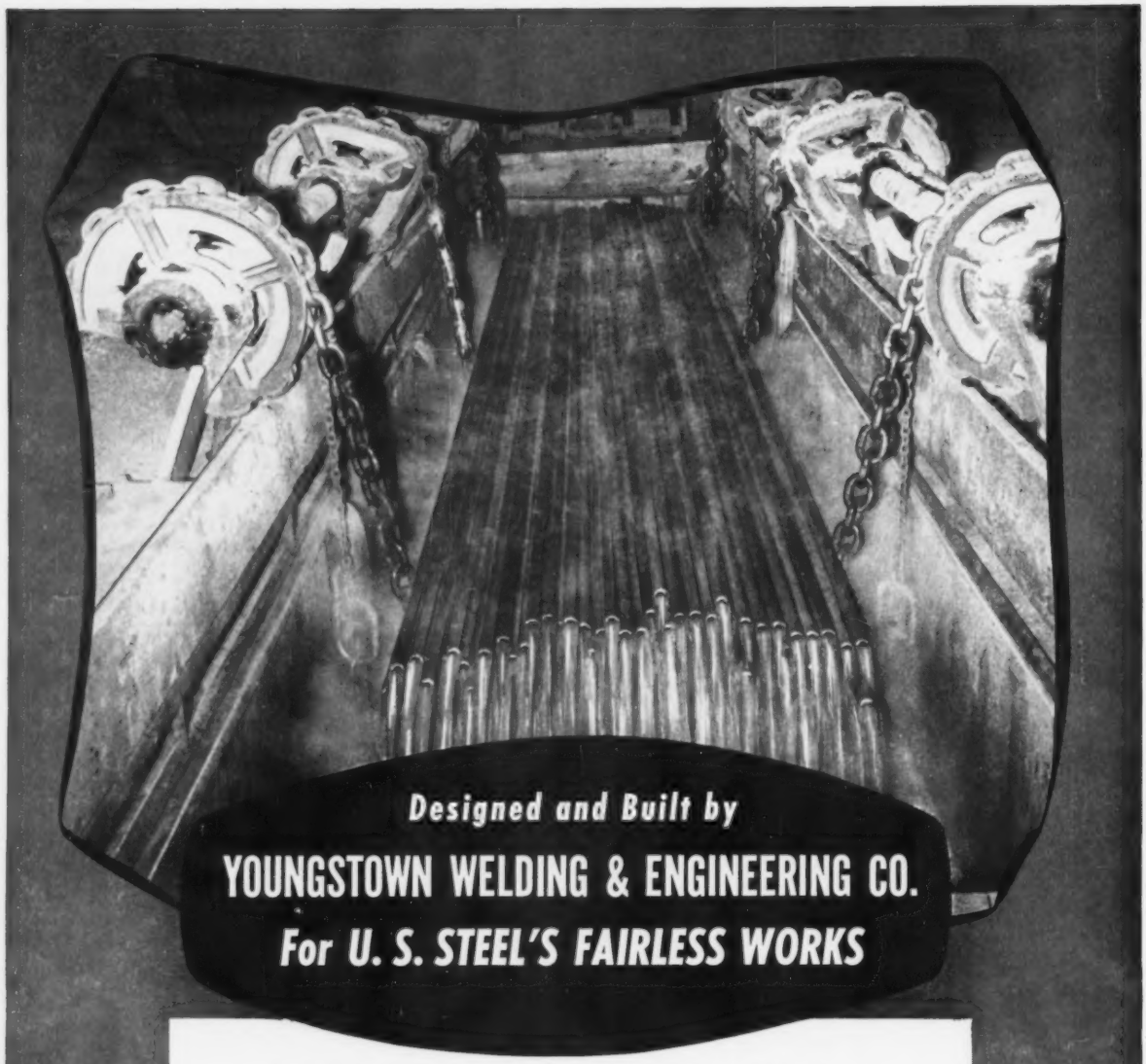
Trained Pittsburgh Steel engineers are readily available with counsel and wire know-how that will help solve your problems. You can get that help today by calling any of the Pittsburgh Steel district offices listed below.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
Cleveland	Dayton	Los Angeles	Pittsburgh	



Designed and Built by

YOUNGSTOWN WELDING & ENGINEERING CO.

For U. S. STEEL'S FAIRLESS WORKS

Three 15-Ton WELDCO MECHANICAL TUBE PICKLERS, like the one shown above, assure fast, efficient, low-cost pickling at the new Fairless Works. If **you** want uniform pickling, better finish, and big savings in manpower and maintenance, investigate WELDCO's complete line of Mechanical Picklers—for Bars, Tubing, Coils and Sheets.

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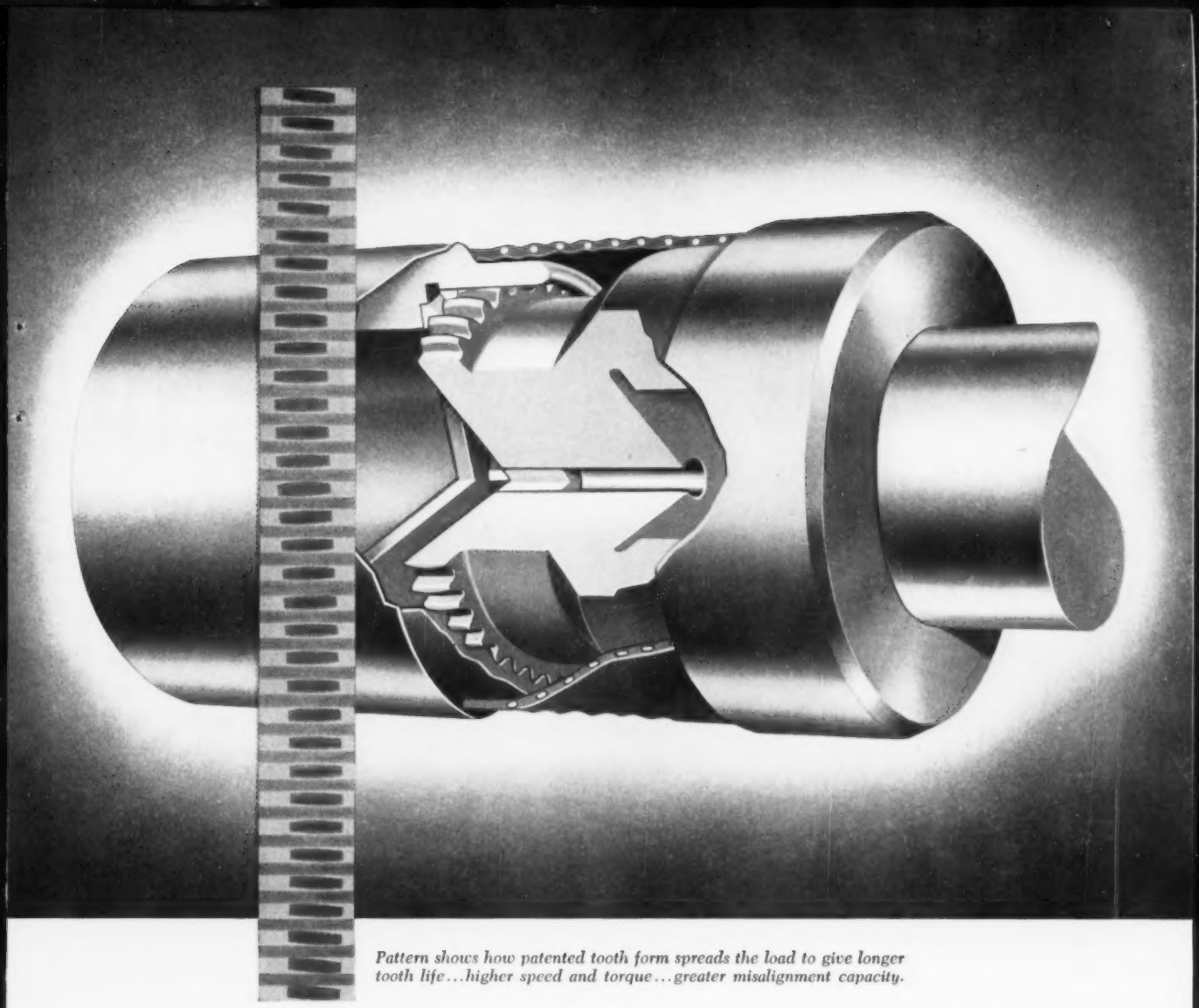

Pattern shows how patented tooth form spreads the load to give longer tooth life...higher speed and torque...greater misalignment capacity.

Proof that Amerigear-Bliss couplings last longer

Many installations of the Amerigear spindle coupling have operated continuously without tooth failure for four years.

The secret of the long-lasting teeth of the Amerigear-Bliss spindle is their patented fully-crowned form. This eliminates tooth end and tip loading and permits greater angular or lateral misalignment; this results in constant velocity, minimum wear and minimum power loss. The crowned flank maintains the load on the central portion of a greater number of teeth, making higher torque ratings possible, and holding backlash to a minimum.

To sum up, these couplings provide *vastly longer tooth life...higher torque...higher speeds...and higher misalignment capacity.*

E. W. Bliss Company's Rolling Mill Division has acquired all rights to the manufacture and sale for use in rolling mills of the famous Amerigear gear type spindle coupling.

For complete information, write us today.

100 years of making metal work for mankind

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E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio
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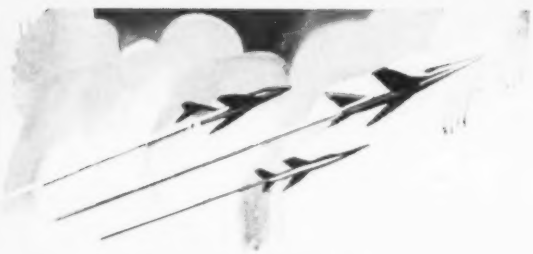

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The Division's precision controlled production means more accurate development now . . . smoother production later. Coordinated facilities for casting, forging, grade rolling, machining and extrusion round out the picture. Write today for qualified engineering consultation, without obligation.

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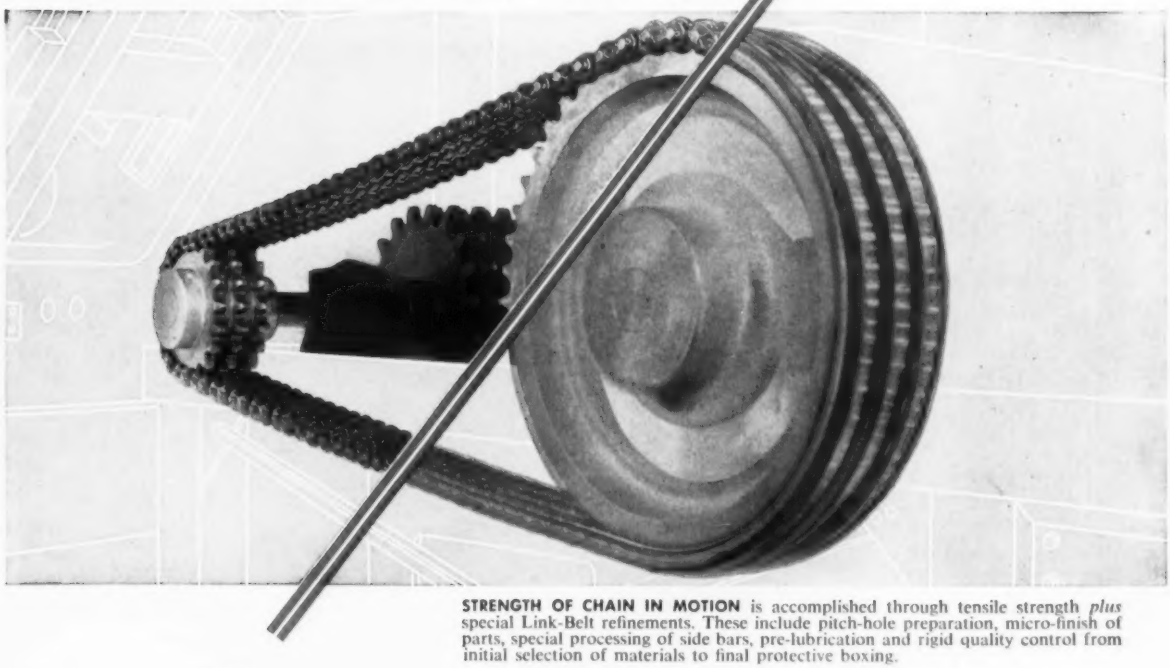
Not just static strength, but . . .

RESISTANCE TO TENSILE STRESS is achieved by use of properly heat-treated, accurately-machined side bars made of premium steel and fitted with properly-hardened pins, bushings and rollers. But to resist *operational* stresses, additional controls over dimensional accuracy, uniformity and roller resiliency are essential.



STRENGTH OF CHAIN IN MOTION is accomplished through tensile strength *plus* special Link-Belt refinements. These include pitch-hole preparation, micro-finish of parts, special processing of side bars, pre-lubrication and rigid quality control from initial selection of materials to final protective boxing.

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assures longer work-life for LINK-BELT Roller Chain

In addition to known tensile loads, roller chain in motion is frequently subject to other operating stresses. Engagement with sprockets . . . shock of starting loads . . . centrifugal loads—there are many similar stresses.

Link-Belt's solution: greater dynamic strength, achieved through design, manufacturing and processing "extras" . . . plus a combination of other important refinements. And you see the results in smoother, more efficient performance that lasts measurably beyond the life of ordinary roller chain—cuts your drive and conveying costs.

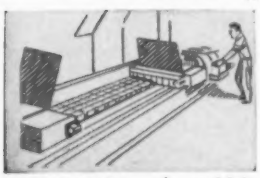
Near you is a Link-Belt office or authorized stock-carrying distributor where you can get full information on the complete Link-Belt range of single and multiple widths, ¼ to 3-inch standard pitch, and 1 to 3-inch double pitch. Ask for your copy of 148-page Data Book 2457.

LINK-BELT

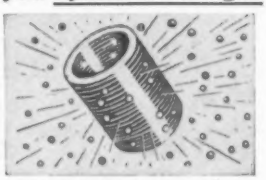
ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.121

LINK-BELT gives you dynamic strength that comes from these important EXTRAS

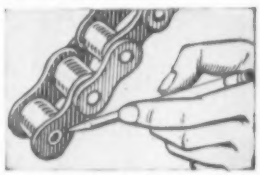


PRE-STRESSING of multiple width chain provides uniform load distribution.

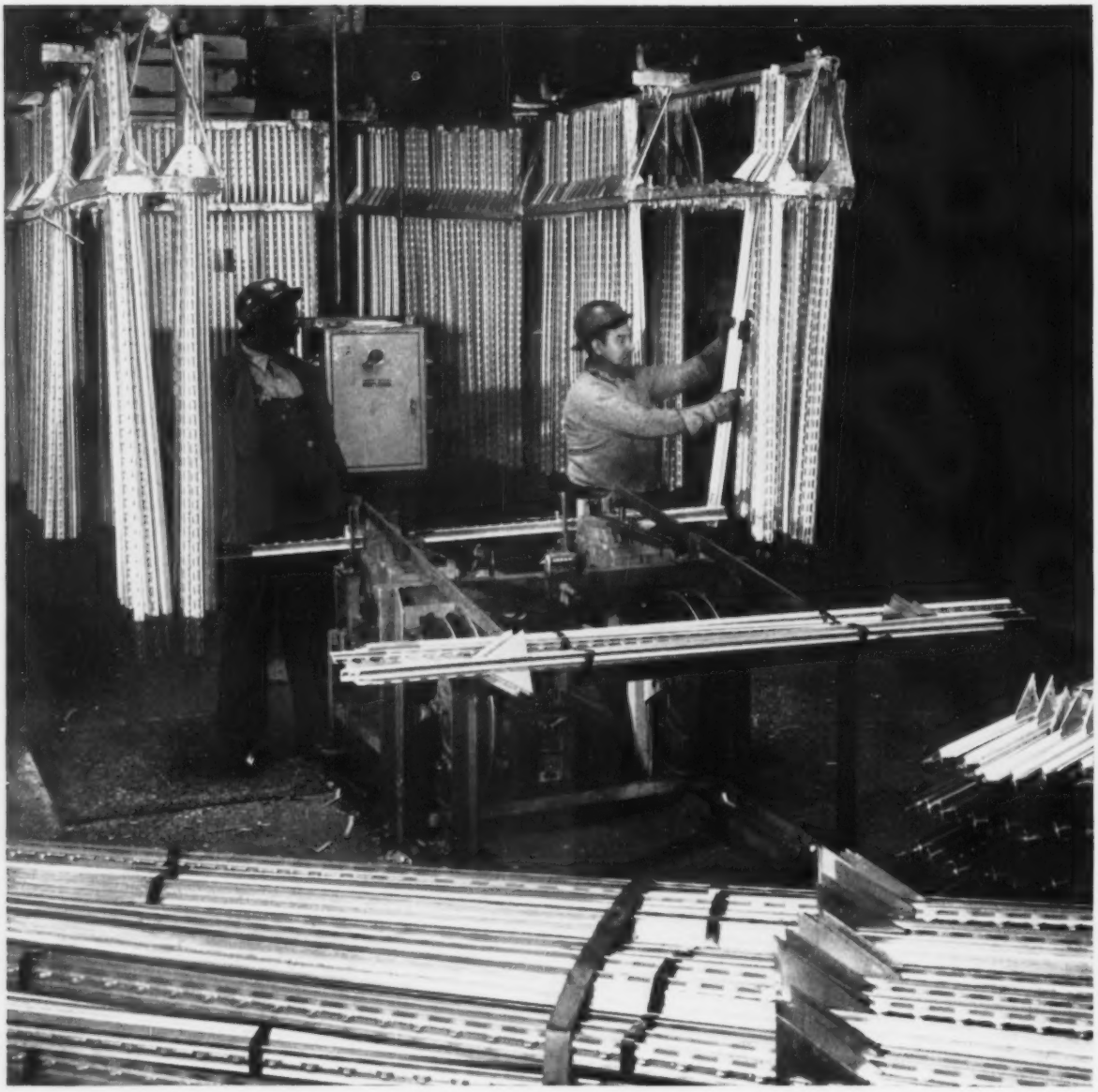


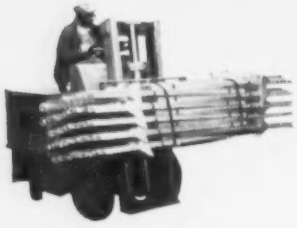
SHOT-PEENED ROLLERS have greater fatigue life, added ability to withstand impact.

CLOSER HEAT-TREAT CONTROL —coupled with rigid testing insures uniformity.



LOCK-TYPE BUSHINGS (applied on a range of sizes) end a cause of stiff chain.





Power does the hustling

These Signode power strapping machines put two straps around a bundle of steel fence posts in four seconds, complete. Then 50 or so small bundles are stacked and hand-strapped to make a big 4000-pound bundle. Over-all strapping time is four times faster than the former tying method. Bundles are tighter, neater—stay tight to destination. Total cost of all the steel strapping in each big bundle is only about a dollar—the whole package material cost! You can't beat the speed, strength and low cost of Signode steel strapping for tying things together. To make your product cost less to handle, store, ship and receive, see your Signode man, or write:

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WALLACE BARNES STEEL DIVISION – Producer of High-Carbon Strip Steel

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She's enjoying an afternoon by a beautiful pool

Mr. V. N. Agather, Vice President of Production at La Consolidada, S. A., Mexico, Manufacturers of Malla-Lac—Concrete Reinforcing Wire Mesh.

—he helped make it possible with Sciaky Resistance Welding Techniques

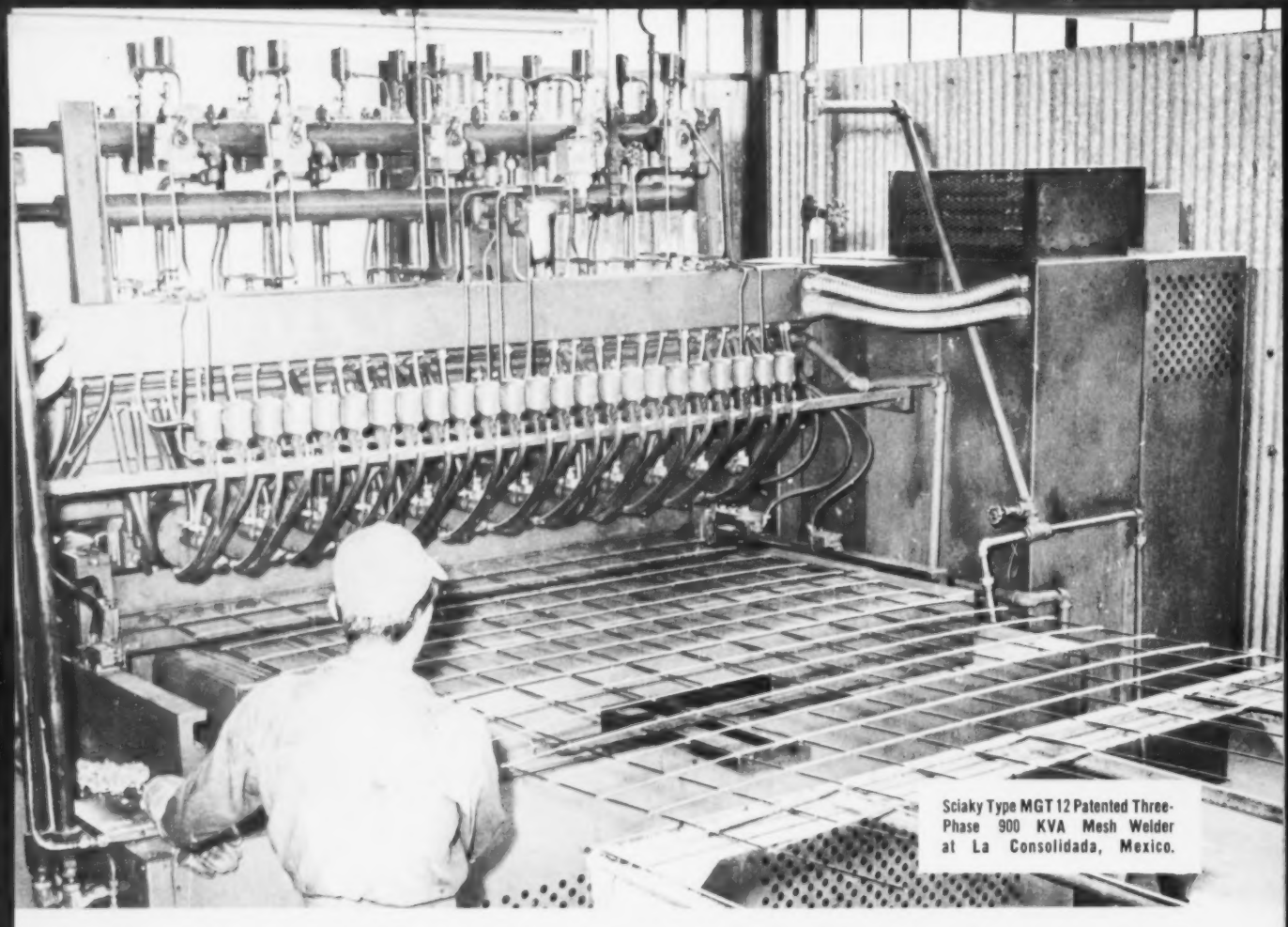
Not only are Mexican swimming pools made with La Consolidada concrete reinforcing wire mesh, but office buildings, commercial structures and private homes as well. Critical shortages of lumber and fabricated structural members in Mexico force the extensive use of reinforced concrete construction.

As the leading Mexican manufacturer of steel wire and wire products, industrial fasteners and merchant bar products, it was natural for La Consolidada to become the first to introduce resistance welded wire mesh for concrete reinforcing.

In their need for a production process that would satisfy their particular complex requirements, La Consolidada turned to Sciaky Resistance Welding Techniques exclusively. Because Sciaky Resistance Welding Techniques are designed to put the profits back into manufacturing! Turn the page for more information on how La Consolidada does it.

SCIAKY®

There are Sciaky plants in Chicago, Paris and London, as well as an Application Research Center in Los Angeles, California



Sciaky Type MGT 12 Patented Three-Phase 900 KVA Mesh Welder at La Consolidada, Mexico.

La Consolidada Offers 32% Savings in Steel to Building Construction with Concrete Reinforced Wire Mesh

***Sciaky Resistance Welding Techniques* used exclusively to introduce concrete reinforcing wire mesh to Mexico**

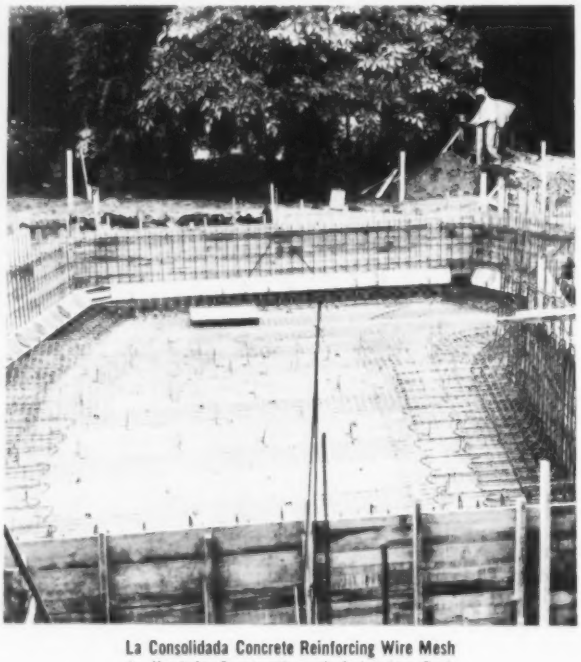
La Consolidada's wire mesh, called Malla-Lac, has received immediate, overwhelming acceptance and future production is already sold out. Much of this success is due to production methods and Sciaky equipment tailored to specific needs:

1. **Versatility to provide range of mesh and wire sizes.**
2. **Capacity to match needs.**
3. **Simplicity of operation and maintenance.**
4. **Dependability in heavy duty operation.**
5. **Lowest cost to put equipment in production.**
6. **Ability to get service in Mexico.**

Sciaky resistance welding techniques and equipment satisfy all of these requirements. It enables La Consolidada to sell Malla-Lac at a price competitive to reinforcing bar. It enables La Consolidada to produce a product of the quality necessary to building construction.

If *you* fasten metal products together to fabricate your products, take advantage of Sciaky Resistance Welding techniques—like La Consolidada does!

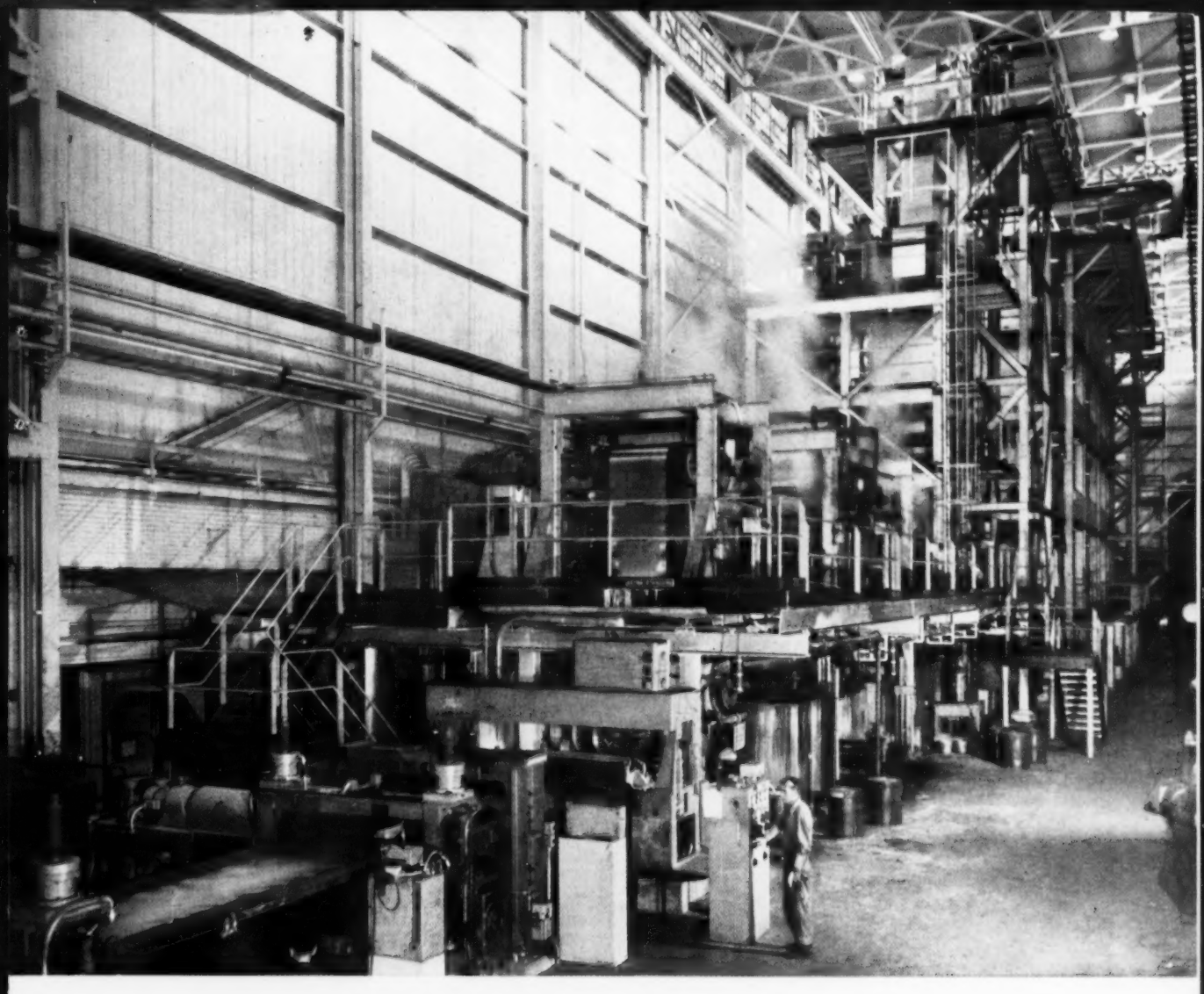
Further data is given in the publication "Resistance Welding At Work", Vol. 5, No. 2. Write for your copy.



La Consolidada Concrete Reinforcing Wire Mesh As Used In Construction of Swimming Pool.

Sciaky Bros., Inc., 4930 West 67th Street, Chicago 38, Ill., POrtsmouth 7-5600

SCIAKY®



Continuous ANNEALING LINES...

• This is one of several Continuous Annealing Lines designed and built by Aetna-Standard. The line processes 48" wide strip maximum at 1000 feet a minute at Dominion Foundries and Steel, Limited, Hamilton, Ontario, Canada. This line has been designed so that the Annealing Furnace can be bypassed and strip run through for cleaning only.

Like Continuous Galvanizing or Tinning, a Continuous Annealing Line requires efficient design and rugged equipment. As a pioneer in Continuous Lines and other equipment for processing sheet and strip, Aetna has broad experience in the design of equipment required for your specific application.

Our Sales Engineering Staff is available for consultation to help analyze your requirements upon your request.

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GENERAL OFFICES: PITTSBURGH, PA. **PLANTS: ELLWOOD CITY, PA., WARREN, OHIO**

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Which tin has the FrosTin*?

Manufacturers of "tin" cans have many customers whose products require great protection against corrosion on the inside of the can but less on the outside. Inland had provided this differentially-coated electrolytic tin plate which conserved tin resources and reduced costs, but a problem arose. Both sides were mirror-bright; can makers couldn't tell them apart. So, Inland researchers developed "FrosTin", tin plate with a frosty satin finish on the thinly coated side. Continuous product improvement is but one of the ways in which Inland serves steel users.

*T. M. Registered

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Mill Construction Slows

Steel mills are dragging their feet on new construction programs. This includes both tentative projects and those for which money has already been appropriated. The tipoff comes from mill equipment makers. Most of them still have heavy shop backlogs, but one frankly admits that new orders have dropped off sharply. The same firm says its engineering load on new design projects is lighter, too.

Clocks Production Time

A Dutch-designed clocking device mounts on a machine tool to record how much time the machine actually works. Non-production time is clocked, too, along with the reason why the machine isn't busy. The production analyzer sets off a signal whenever work isn't being turned out. Responding to the alarm, the machine operator notes the reason for the shutdown and logs it for the record.

Light Alloy Plating

Beryllium can now be electrodeposited from organic solutions. Process, developed by the National Bureau of Standards, also plates alloys of magnesium, titanium or zirconium with aluminum. Hope is that continued research will find a way to plate pure titanium and zirconium in a similar manner. Both would be invaluable as coatings in hot, corrosive atmospheres.

Low-Cost Bundle Strapper

An inexpensive steel strapping machine will soon be announced for fast handling of packaged products. The unit will strap small packages of anything from stove bolts to electronic components, and will also wrap bundles up to 2 ft wide at a 24-per-minute clip. It will be billed as the lowest priced automatic round strapper on the market.

GM Next UAW Target?

If the United Auto Workers strike in 1958 over a short work week, or more likely just a fat pay boost, General Motors is likely to be the target area. After Ford was singled out for the SUB drive in 1955, rumor had it that a "gentlemen's agreement" would keep the firm off the hook next time there was a big issue. Some skeptics say, however, that because GM is a tough negotiator, it would be easier financially to strike Ford again. Chrysler is still too weak. A strike there would be disastrous.

Cleaner "Tonnage" Steels

A new method for vacuum degassing "tonnage" steels doesn't require elaborate equipment. Nor does it hamper large-scale production. The process fits in between tapping and teeming operations. Liquid steel is sucked into a degassification chamber by a pipe dipped into the casting ladle. After the metal is "vacuum cleaned," it is promptly returned to the ladle.

Tax Break on Used Tools?

There's a fairly good chance that Congress will give used-machinery buyers a break in the form of fast tax writeoffs. Since direct tax cuts for small business are virtually a dead issue this year, lawmakers will press hard for indirect tax benefits. The proposal to permit faster depreciation on the first $50,000 of used machinery bought in a year's time has solid backing from the White House.

Skip Wheel-Dressing Delay

Firms doing production form or thread grinding stand to gain many benefits from a new process that eliminates time-out for wheel dressing. The idea is simply to dress the wheels while they work. Key elements in the technique are a long-wearing, formed dressing tool and a grinding machine attachment that keeps the dresser in proper contact with the abrasive wheels.

Next Senate Inquiry

Management may chuckle at the Teamster's troubles now, but some of its own practices are slated to come up for Senate investigation next year. Areas already being explored include expense account abuses, "cozy" deals with unions to prevent labor troubles, complicity in pension and welfare fund raids, and failure to turn over social security and withholding taxes to Uncle Sam. Firms in the building and construction trades will feel the heat first.

Five small Farval systems protect world's largest adjustable-rail milling machine

FARVAL—
Studies in Centralized Lubrication
No. 199

KEYS TO ADEQUATE LUBRICATION—
Trailer truck and car illustrate the tremendous size of this great machine tool. Red key-arrows indicate two of five Farval systems. Whenever you see this sign of Farval you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

THIS 615-ton milling machine, installed at Schenectady, machines steam-turbine-generator parts up to 18 feet wide and 16½ feet high to close tolerances.

Vital to its smooth operation are five manual Farval systems which lubricate the rail nuts on the cross rail. Two of them are visible in the photograph. With Farval, accurately measured amounts of oil or grease can be delivered to bearings whenever needed.

Five small Farval systems are an insignificant part of the cost of protecting the $1.5-million investment in this world's largest milling machine.

You, too, can protect your machines inexpensively with Farval. Why not investigate, then invest! Just ask for Bulletin 26-S. Our representative will call at your convenience. The Farval Corporation, 3282 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

An Exclusive Article **by the Secretary of the Treasury**

George M. Humphrey

▪ I appreciate this opportunity to submit to the readers of THE IRON AGE my views on the Government's so-called fast amortization program.

The program, cut back by the Executive Branch of the Government, now applies only and strictly to limited direct-defense items. I have consistently advocated this and feel sure that the present limitations should be continued—unless bills now pending in Congress are passed which will either repeal or limit it even further.

From November 1950, to March 20, 1957, almost 22,000 certificates were issued under the 5-year amortization program. The total cost of these projects was almost $39 billion. Almost $23 billion, or about 60 pct was made eligible for the 5-year write-off.

In July 1955, I first expressed publicly my growing concern about the emergency amortization program before a subcommittee of the House Committee on Government Operations. I stated that while emergency amortization may have served a useful purpose during the Korean emergency, it was an artificial stimulus of a dangerous type.

Why We Must Limit Fast Tax Write-Offs

▪ Some degree of defense mobilization on a substantial scale may be essential for years to come. But expansion of our major productive facilities should be an integral part of our long-range, natural economic growth. Our basic defense capacity, except for a few very special items, cannot be separated from the broad base of our productive capacity.

Artificial stimulants may well become artificial controls. Because rapid amortization is not applied universally, it could create a competitive imbalance in the sound, vigorous growth of our free economy. It is not the American way.

Administrative Difficulties — A highly-selective program for direct-defense items in short supply may well have merit if it is strictly limited to very special cases. But the broader the program—the more it extends into areas other than the production of such special items—the more difficult it becomes to administer wisely.

The amounts certified for fast write-offs dropped below $300 million in each of the four quarters preceding July 1955. Then, because of the backlog of pending applications, they surged up to more than $1 billion in each of the last three quarters of fiscal 1956. The total for the year came to $3.8 billion. Since then they have fallen to less than $200 million in the quarter ending last December, after many goals were closed by order of the Executive Branch of the Government.

Revenue Losses—These high figures show the large amounts that may be involved in a continuing mobilization program even in a cold-war period. The revenue lag from certificates issued through 1956 probably exceeds $5 billion

Continued from Page 67

during these early years which will be recovered in the years after 1960. But the interest cost to the Government, over the entire period of lag in tax collections, will be roughly $3 billion.

DANGERS OF A BROAD PROGRAM

The effects of a broadly-applied amortization program go far beyond the effects on Government revenue. First, there is the stimulating effect which can temporarily add to inflation, with the possibility of a lag later. Then, when rapid write-offs are permitted for facilities which will be largely used to supply eventual regular civilian demand, there inevitably will be dislocations and unfair advantages between whole industries—and individual companies within an industry.

Much of the total has been of this type. For example, over 14 pct of the total amortizable cost of facilities through December 28, 1955, was granted to utilities and sanitary services; over 16 pct more went to railroads; and about 20 pct went to primary metal industries. Other whole industries had none.

Unfair Advantage — There are many industries where some percentage of production would be required in the event of war; but where without war, our increasing population and productivity will require their continued expansion. These are in sharp contrast to limited-purpose defense facilities such as shell-loading or specialized aircraft or armament plants.

Five-year amortization may be

"Expansion of our major productive facilities should be part of our long-range economic growth."

"A highly selective program for direct-defense items in short supply may well have merit if it is strictly limited."

"Special tax reduction for favored groups only postpones the day when general tax reduction can be enjoyed by all."

A Look at Depreciation Problems and Policies

■ Two years ago President Eisenhower recommended changes in the tax law, as part of his tax reform program, to give taxpayers the right to use more realistic depreciation methods. The Congress adopted this recommendation and authorized the use of diminishing balance and the sum-of-the-year digits methods of depreciation.

The faster depreciation available to all taxpayers since 1954 has been important in encouraging new investment. The faster recovery of capital has eased relatively short-term debt financing. This is particularly important for small businesses.

Shift Emphasis — At the same time that the tax law was being changed to permit a shift forward of depreciation charges, an important administrative change was also made. Emphasis was shifted from the past to the future in determining useful lives of depreciable property.

Historical records had been the principal basis for determining the probable lives of depreciable property. There were, however, several reasons why the experience before 1954 was not a good basis for estimating future use of new equipment.

Slow Turnover—During the depression years, many companies did not immediately need, nor could they finance, new equipment; they therefore kept their old equipment. During the war years, old equipment was kept because it was

an alternative to direct government construction and ownership of limited-purpose facilities since private capital is not likely to go into them. But this is far different than giving rapid write-off to selected industries for general purpose plants or equipment in an expanding economy.

Create New Problems—There is no fair or logical end to such a program. The margin of excess capacity in such industries at any time will regularly be absorbed by growing civilian demand and have to be regularly reestablished in later years. There would be continuing costs and revenue lags and the creation of new competitive problems.

We are not unaware both of the desirability as well as of the financial problems involved in modernizing and replacing old capital equipment. Nothing is more important than obtaining the capital to increase our productivity and make new and better jobs. Our high productivity of labor is possible only because of tremendous capital investment—over $10,000 per man in general manufacturing, and over $50,000 in several industries.

Postpone Tax Cuts — Getting funds for the construction of new plants or facilities is a continuing serious problem. High tax rates make it harder to save from current income. They also lessen the incentive and discourage the productive, and perhaps risky use, of savings. It is essential to reduce tax rates as rapidly as can be done soundly. But tax reduction for favored groups only postpones the day when general tax reduction can be enjoyed by all the people.

"We are not unaware . . . of the problems involved in modernizing and replacing old capital equipment."

"Nothing is more important than obtaining the capital to increase our productivity and make new and better jobs."

"The faster depreciation available to all taxpayers since 1954 has been important in encouraging new investment."

needed and new equipment was not available.

Finally, the big increase in replacement costs because of inflation during and after the war made it necessary in many cases to keep and renovate rather than replace much old property.

THE IMPORTANCE OF A FORWARD LOOK

The new depreciation regulations recognize the importance of a forward look with the statement—

"Obsolescence may render an asset economically useless to the taxpayer regardless of its physical condition. Obsolescence is attributable to many causes, including technological improvements and reasonable foreseeable economic changes. Among these causes are normal progress of the arts and sciences, supersession or inadequacy brought about by developments in the industry, products, methods, markets, sources of supply, and other like changes, and legislative or regulatory action. In any case in which the taxpayer shows that the estimated useful life previously used should be shortened by reason of obsolescence greater than had been assumed in computing such estimated useful life, a change to a new and shorter estimated useful life computed in accordance with such showing will be permitted. No such change will be permitted merely because in the unsupported opinion of the taxpayer the property may become obsolete."

This does not mean that a business may claim a short life for new property merely because it "may" become obsolete. But it does mean that well-considered estimates based on present considerations will not be upset merely because similar

Continued on Page 70

TAXES AND SUBSIDIES

The power to tax is the power to destroy. And revenue laws should be used only equitably to raise revenue, not for other purposes. It is dangerous to use the tax laws for social purposes, to form one citizen or group of citizens over others, to exercise economic controls or to indirectly subsidize any segment of our economy.

If, in the wisdom of Congress, subsidies or assistance to special groups or for special purposes are desired, then appropriations should be made for that purpose. These can be submitted to the Congress through regular channels where the amounts will be well known and available for public criticism.

The Congress can then vote specifically in favor of or in opposition to such special treatment for any group or item. Subsidies should not be hidden in tax laws.

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property has heretofore been held for longer periods.

Review Useful Life — Another step in bringing tax depreciation up-to-date has been made recently. A study is underway to review the useful lives contained in Bulletin F as a basis for their revision in the light of the best present knowledge. Many of the lives in the old Bulletin F have become outdated and the present reprint of the Bulletin recognizes this with the statement—

"Although Bulletin F is out-of-date, the tables of useful lives are reprinted so that taxpayers may not be left without any guide. However, taxpayers are cautioned that the useful lives shown are not mandatory, and were originally published solely as a guide to what might be considered r e a s o n a b l y normal periods of useful life."

The study leading to revision is a major project and will take a considerable amount of time. Trade associations and other interested groups have been invited to submit relevant material.

Changes Have Helped — These changes have already aided and will continue to improve ordinary depreciation accounting for tax purposes. Their existence makes the curtailment of the 5-year amortization program less important than it would if these changes had not been made.

THE PROBLEMS IN MAKING REVISIONS

These improvements do not meet the most perplexing problem of financing renewals and replacing plant and equipment at present costs. Because of inflation these costs are much greater than the original plant and equipment costs and the amount of depreciation received.

The strict legal concept of depreciation is that a return of capital should be made without payment of income tax. But that, of course, relates only to the original cost. The allowance, tax free, of any greater figure would have to be based on some entirely different concept—if it is deemed best in the national interest to do so.

There are two very practical difficulties to the making of any such allowance. Let's take a look at them.

Lack True Measure—First, when a machine or plant is worn out, it is almost never replaced with the same kind, quality, or productive capacity as the original installation. It is almost universally replaced with something bigger, better, and more productive, at less operating cost per unit, although the capital cost is much greater than that of the original installation.

There is no way to measure this improvement unless we are to say that an existing business is entitled continually to increase and improve its plant and equipment tax free. In that case, how do we protect the competitive position of the new enterprise which can raise its capital only after full taxes have been paid on the savings from which new investment is made?

Second, how can we estimate today what the replacement cost of a machine or plant will be when it is worn out years from now? How can we guess what the future depreciation in the value of the dollar will be—and how much more or less it will cost to replace property years from now than it does today?

No Pat Answers—For instance, should the man who built ten years ago be entitled to the very rapid rate of depreciation of the dollar which occurred during the late forties? Or should a man who built only three years ago be entitled only to the very much lesser rate of depreciation of the dollar which has obtained for the past four years? And who is to say whether the rate will be greater or less during the next several years for the man who builds today?

We recognize the problem, but as yet we see no satisfactory answer.

The more realistic depreciation procedures now generally available to all taxpayers are a marked improvement. Depreciation methods should be continually reviewed to increase sound capital investment and the economic growth which this nation must have to fulfill our dreams of true American progress and freedom.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th St., Philadelphia 39, Pa.

UAW Boosts Skilled Workers

And Wins a Big New Strike Weapon

Granting of special status to skilled workers may mean a new trend in labor relations.

Growing number of skilled and professional workers is result of technological changes in makeup of plant work force.

UAW means to hold on to its membership.—By R. D. Raddant.

■ The delegate to the United Auto Workers convention relaxed in the lobby of a plush boardwalk hotel in Atlantic City.

"There's no doubt about it, the skilled worker has a point," he conceded. "I don't represent any skilled workers, but I'm supporting the move."

Skilled Workers at Stake—What he really meant was that the UAW leadership had done a good job selling the membership that its skilled workers had to get special status. At stake was the possibility of losing the opportunity of new membership gains, or, worse still, losing skilled workers to craft unions.

As a result, the UAW last week approved sweeping changes to give special bargaining rights and other privileges to skilled workers.

New Strike Weapon—In addition to cementing ties with the skilled group, the union also gained a valuable bargaining weapon in its new skilled trades program. It gives the skilled workers the right to make supplementary agreements on their special problems, with not only the right to reject an agreement but the right to strike.

This, obviously, will give the UAW a double-edged strike threat when it goes to battle in 1958 upon expiration of current contracts with the auto companies.

Rebellious Mood—The granting of special status to skilled and white collar workers and engineers had been brewing since the signing of the 1955 agreement. This history-making contract, which won supplemental unemployment benefits, was soundly opposed by many skilled workers, who in some cases threatened to bolt the UAW for the skilled trades.

Opposition to the new program from within the UAW was centered on the fear that the action might weaken the concept of industrial unionism on which the CIO was founded and on which it has prospered.

It Was Inevitable—Actually, the UAW had no choice over the long term but to yield ground to the growing number of skilled, professional, and white collar workers.

In presenting the issue to the convention, Leonard Woodcock, UAW vice president, pointed out that the percentage of professional, skilled, and white collar workers in industries represented by the UAW had grown from 22 pct to 31 pct in the past five years. He forecast 40 pct in the next three years.

More Power—"What power will we have as we represent an increasingly smaller portion of the workers?" he asked. He cited several elections coming up this year where skilled workers will vote on union membership.

"If we pass this program, we're reasonably sure they will join . . . Then our economic power, instead of shrinking, will be multiplied enormously."

IN CONTROL: Jubilant Walter Reuther won unanimous re-election as head of the UAW. The militant labor leader carried his entire slate of officers, pushed through a dues increase, gained virtually every point on the agenda at the Auto Workers convention at Atlantic City last week.

H-IRON ~~Versus~~ BLAST FURNACE

	H-IRON PLANT	BLAST FURNACE
Capital Investment	$23 million (Texas)	$47 million, including coke ovens
Ore Unloading	$7 million	$7 million
H-Iron Passivation*	$1 to $1.5 million (est.)	
Cupola*	$7 per annual ton (excl. coke cap.)	
Operating Cost		
Iron Making	$30–35 per ton	$35–40 per ton
Passivation*	50–75c per ton (est.)	
Cupola Reduction*	$7 plus per ton	
* May not be necessary.		

CAPITAL COST: H-Iron Versus Conventional Ingot Capacity**

1. Blast Furnace and coke ovens and (openhearths)	Highest Cost
2. H-Iron plant (electric furnaces)	50 pct less
3. H-Iron plant plus hot blast cupola and coke ovens and openhearths	20 pct less

** Assuming charge is 50 pct scrap, 50 pct hot metal or H-Iron. Source of H-Iron figures: Hydrocarbon Research, Inc. Figures apply to completely new plants with capacity of over 1 million tons.

How Close is Commercial H-Iron?

Low initial cost is one advantage of direct iron ore reduction plant when compared with blast furnace installation.

Semi-integrated specialty mills may be first to make commercial plunge.—By G. J. McManus.

■ The reason steelmakers are craning their necks to look at direct reduction of iron ore was spelled out last week when an authority on the process unwrapped this cost package:

1. A direct reduction plant that will turn out 2200 tons a day can be built for $23-24 million.

2. Hydrogen-reduced iron can be produced for $13.60 a ton, not counting ore cost.

3. Ores high in gangue can be used in direct reduction plants if auxiliary equipment is installed. Added cost is about $7 a ton.

4. Installation of a direct reduction plant instead of a blast furnace can save 20 to 50 pct in the construction of steel and iron making facilities for a brand new mill.

The Background—These figures were given to blast furnace men in Pittsburgh by Dr. A. M. Squires of Hydrocarbon Research, Inc., New York. Hydrocarbon has tagged its product H-Iron. It has been working with Bethlehem Steel about four years in a pilot plant operation at Trenton, N. J. In its process, a stream of hydrogen blows up through powdered iron ore, uniting with the oxygen in the ore and leaving iron sponge. (THE IRON AGE, July 12, p. 71).

Big advantage claimed for this process over a blast furnace is low initial cost. A modern blast furnace will cost about $50 million. For a 2200-ton H-Iron plant built in Texas, Dr. Squires places the cost at $23 million. For the same unit on the East Coast, he puts the cost at $24 million.

Cost Basis—The H-iron estimates cover equipment for producing hydrogen, for crushing iron ore to powder, and for compacting the reduced iron. They are based on information obtained by Hydrocarbon in engineering several commercial-size H-Iron plants. The company has obtained vendors quotations on more than three-quarters of the equipment items involved.

Two types of steelmakers are intrigued by the relatively low capital costs of direct reduction plants. Several of the larger producers face decisions on integrated mills at Western or Southwestern sites. Jones & Laughlin, for one, has options on land near Houston, Tex., for an integrated pipe mill.

Mill Interest—Speaking of this project recently, J&L board chair-

man Ben Moreell pointed to the backbreaking cost of such a venture ($200-$400 million) and said he saw small chance of a move in the near future. He left the door open, however, saying that a technical breakthrough (or higher steel prices) might change the picture. He declined to say how an H-Iron plant would affect the cost of the proposed mill but it is known that J&L has received commercial cost estimates from Hydrocarbon Research.

U. S. Steel Corp., which is considering a new plant for the West Coast, is conducting independent research on direct reduction. Bethlehem Steel is said to have put over $1 million into development of the H-Iron process.

Commercial Outlook—But many feel the first commercial application of direct reduction will be by one of the semi-integrated producers of quality steels. Stainless producers took a beating from last year's runaway scrap market and they have a serious problem of contaminants in their scrap.

At least one big stainless producer is now thinking in terms of either a blast furnace or a direct reduction plant.

In this connection, Dr. Squires estimates the capital outlay for an H-Iron plant and electric furnace capacity would be less than half the outlay for blast furnace capacity, openhearths and coke ovens producing equal quantities. His figures apply to new and separate facilities, using 50 pct scrap charges in both cases.

Savings Estimates—On the final cost of steel ingots, Dr. Squires sees H-Iron permitting savings in most cases, with the exact gain varying with the price of scrap and the amount of scrap used.

One thing his figures do indicate is that in some applications, H-Iron would not reduce ingot cost until the price of scrap went over $40 a ton. In line with this, some steelmen feel direct reduction plants may serve as standby capacity.

General Cable Licks Old Problem

German-built press makes electrical cable continously sheathed with aluminum.

Machine protects thin paper and rubber insulation from high extrusion temperatures.

▪ A new, German-built extrusion press is now turning out electrical cable continuously sheathed with aluminum at General Cable Corp.'s Perth Amboy, N. J. plant.

The new press, built by Schloemann A. G., adds the corrosion resistance and thermal properties of aluminum to more conventional sheathing materials.

The Problem—Cable failure from temperature failure or disintegration of the sheathing in corrosive atmospheres has been a problem to the electrical and wire communications industries for years.

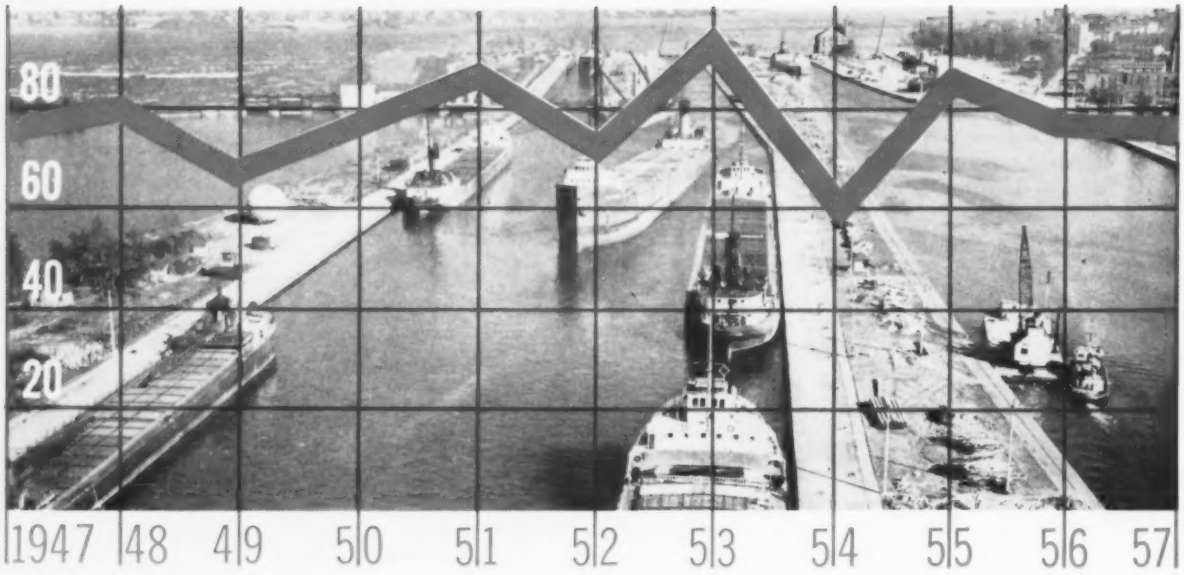
Aluminum has often been suggested as the proper sheathing material in many cases, but until now no way had been found to sheath the cable by high-speed methods and still protect thin paper and rubber insulation from the high temperatures needed to extrude aluminum. General cable reports that its new Schloemann press has overcome this obstacle.

The Answer—Paper and rubber insulated cables from under ¼ to over 2 in. diam are being continuously sheathed with commercially pure aluminum at high temperatures without damage to the cable insulation and without air blisters or perforations in the sheathing. Final cables are available either as directly extruded aluminum sheathed, die sunk aluminum sheathed or corrugated aluminum sheathed.

General Cable has high hopes for its new product, and Aluminum Co. of America, which supplies aluminum billets for the process, says it scents a major new market. THE IRON AGE has also learned that a major American press builder will announce a continuous extrusion press for continuous sheathing with aluminum in the near future.

Press Details—The new press at General Cable is a horizontal double piston-double billet unit of 1760 tons capacity. Press frame is a one piece steel casting weighing about 100,000 lb.

GERMAN PRESS: Aluminum covers cable without damaging the insulation.



Ore Plans Indicate Good Steel Year

Lake Superior Iron Ore Shipments, Upper Lake Ports (millions of gross tons) (1957 = Estimated) Source: Lake Superior Iron Ore Assn.

Ore Industry Sees A Big Year

Despite soft spots in the steel market and higher pig iron prices, mills set their sights high.

Lake Superior ore shipments may reach 77 million tons or above.

New highs are predicted for Taconite and Jasper pellet production.

▪ Early orders for iron ore from the Lake Superior district indicate that if steel mills are looking for a decline this year, they aren't showing it in lining up iron requirements.

Most iron ore salesmen in the industry's nerve center in Cleveland report substantial quantities are being ordered and the whole market has firmed up. Almost all steel companies have indicated they will use about the same tonnage as last year.

Signs of Optimism — This is a moral victory in the face of a soft market in some steel products, a 60¢ per ton iron ore price increase, a $2 per ton pig iron increase and a drastic drop in scrap prices. The latter leads steel mills and foundries to increase the ratio of scrap to pig iron in their melt. In addition, blast furnace capacity has increased only modestly—from 85.4 million tons in 1956 to 86.8 million this year.

Shipments from the Lake Superior district this year are estimated by the IRON AGE at 77 million tons, revised upwards from the year-end prediction of 71 million tons. Other predictions in Cleveland run from 70 to 90 million, one of the biggest variations in years. Two top salesmen from leading companies were betting 74 and 80 million tons in the annual office pool.

Newcomers Doing Well — Two new phases of the iron ore business are due to make their heaviest impact this year. Taconite and jasper pellet production are expected to hit new records. Taconite imports will be over 30 million tons.

Biggest taconite producer is Reserve Mining's Silver Bay, Minn., plant opened last year. It will turn out almost 5 million tons this year. Erie Mining Co., a few miles away, at Aurora, was dealt a body blow in construction work by last year's steel strike. It will get into production late this year and may make small shipments. This is destined to be the largest taconite plant and was to start full production this year.

Another Strike Victim — Upper Michigan jasper pelletizing plants are in initial operation and will turn out about 400,000 tons this year. Other tonnage will come from plants in Minnesota and eastern Canada. Shipments last year, which were also crippled by the steel strike, hit about 4.5 million tons. Predictions this year range up to 11 million tons of pellets.

Foreign ore imports last year got a big spurt because of the steel strike. Great Lakes boats were still bucking ice floes into December try-

ing to make up tonnage lost at the height of the season. And a continuing strike by engineers and pilots on the largest shipper added to the deficit.

Imports Increase — Foreign ores from South America took up the slack and continued shipping into late fall and early this year. Last year the imports totalled 34 million tons or near half the Lake Superior shipments of 77.6 million. They also added up to 24 pct of all shipments in the U. S. (141 million tons) compared to 18 pct in 1955.

The Great Lakes fleet will be at full strength this year with all available boats numbering about 250 set to sail. U. S. Steel's Pittsburgh Steamship Div. captured twin honors with the first ore boat through the Soo locks last week—the Arthur M. Anderson — and first to be loaded, the Sewell Avery.

ICE BREAKER: First of the fleet through the Soo locks is Pittsburgh Steamship's Arthur M. Anderson.

Despite heavy ice conditions in eastern Lake Superior, boats are following the Coast Guard Cutter Mackinac through the ice pack in the familiar safari formation. There have already been some shipments from Escanaba, Mich., down Lake Superior to Chicago area plants with limited stockpiling facilities.

While the ore picture is a fast-changing one, the Mesabi range still carries the major load.

Steel Mills Ride Market Shift

Sheet market is slack. But several sheet specialists keep operating rate high.

Secret is to adjust products output to match demand.

■ Two big producers of flat rolled steel products report busy operations and bright prospects, despite sags in important parts of their markets.

Pittsburgh Steel Co. operated at 102 pct in the first quarter. Sales were $49.7 million, or just a shade under last year. President Allison Maxwell predicts capacity operations through the second quarter.

Sales Up—Jones & Laughlin Steel Corp. came through the first quarter at the same pace—102 pct of capacity. Sales were $203.9 million, against $195.2 million last year. J&L president Avery Adams says unshipped orders equal last year's backlog at this time. He looks for a 95 pct operating rate in the second quarter.

Both companies rely heavily on the sheet market. Sheet and strip made up 36 pct of J&L shipments in 1956 and 56 pct of Pittsburgh Steel's shipments.

Strong Balances Weak—But the sheet market is now relatively slack. The two mills have gone outside their usual market areas to keep things humming.

Appliance and auto sales are off a little, but new construction hit an all-time high in January and February. Oil producers are shooting for a record 60,000 wells drilled this year. And shipbuilder and heavy equipment makers have fat backlogs.

Emphasis Shifts—Big sheet mills have more flexibility and diversification than is sometimes realized. Jones & Laughlin, like most other flat rolled producers, switched a portion of its sheet capacity to rolling light plates. Plates and structurals made up 11 pct of J&L shipments in 1956. Current orders point to a substantial hike in this percentage.

Pittsburgh Steel's diversification is one of the most dramatic in the industry. In 1950, 40 pct of its shipments were semi-finished products, 12 pct of the total steel market. A 10 pct drop in the nationwide operating rate knocked out 33 pct of Pittsburgh Steel production.

Today, with the steel industry as a whole down about 10 pct, Pittsburgh Steel expects to stay at 100 pct for the second quarter. Expansion programs for tubular products have boosted Pittsburgh output to half the industry total. Semi-finished steel made up only 5 pct of last year's shipments.

Keep Volume Up—Strong demand for tubular products (27 pct of output) plus improving wire product orders (18 pct of shipments) have combined with "satisfactory" flat rolled orders to keep Pittsburgh Steel's overall volume up.

Jones & Laughlin has a major diversification move coming up. Acquisition of Rotary Steel will put J&L in the stainless market.

Average Price Key—On the subject of product mix, Mr. Adams said that a key factor in any steel mill's success was the average selling price of its products. With cold rolled sheet at $145 a ton, plate at $126 and structurals at $117, no large mill can afford to go overboard on the heavy steel products he says.

On the price question, Mr. Adams said the mills need an increase of $10 to $12 a ton, in July, to stay even with costs.

Shipping Cost Savings Come In Planned Packaging

There's an abundance of available material on packaging. Too few plants take advantage of it.

Those that do take a close look at their packaging problems get a big return on their effort.

Here are some ideas that may be applicable to your plant.

▪ How much money is thrown away by American industry on poorly planned packaging?

Packaging engineers point out that plants which have re-engineered their packaging have reported saving from $36,000 to $500,000 a year.

Packaging is a major industry in itself. In 1956, U. S. firms spent $12 billion to package their products. In 1957, they'll spend four to five pct more.

How It Pays Off—Here are some results of carefully planned packaging:

A plastic bag now wraps a part that was wrapped by hand with cut sheet material. The savings in man-hours have already paid off the cost of the switch.

A supplier of a basic part supplies a base board and crate for an ultrasonic cleaner. When the part arrives at the assembly plant, the crate is lifted off, while the part travels through the assembly line on the original base. At the finish, the crate is simply dropped on the base for shipping.

Assortments of small 50-lb implement parts were packaged, rather than shipped loose, and dropped from a first class to third class freight category. It was cheaper to package on freight savings alone.

Improvements on Pallets — Palletization has been regarded as virtually a materials handling panacea. Nearly 50 million pallets were marketed in 1956, worth $125 million. But there has been too little standardization of pallets, too much over-engineering, too little concentrated study of means to cut pallet costs. However, on the way is a standard for ten standardization pallet sizes.

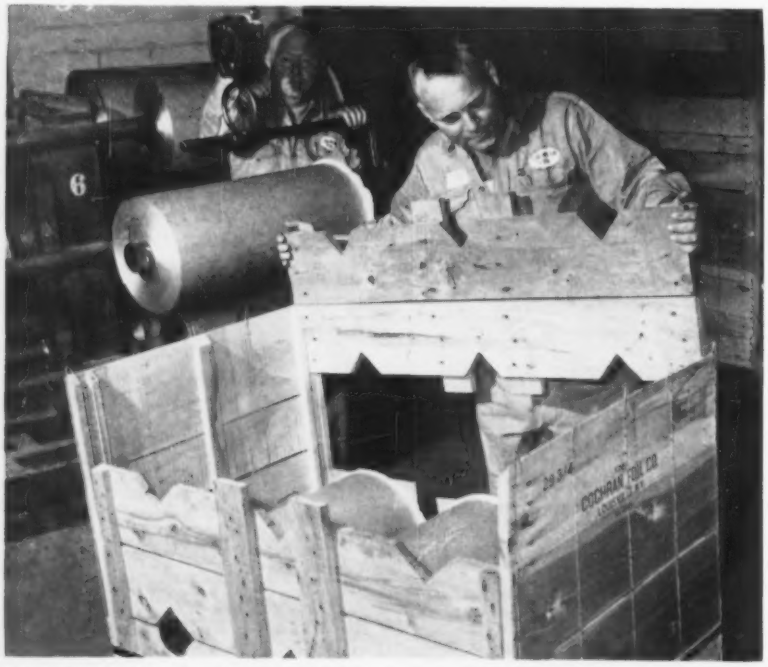
Already here are the disposable pallets. One motor car builder will receive all of his 1957 car radios on pasteboard pallets that are light in weight, but have been recently approved for motor freight hauling, and will sustain a load of 5900 lb.

Start with Organization—Packaging may sound simple, but too many firms are missing a simple bet to stretch their dollars by not making use of economies readily available.

Where should packaging planning originate? Firms which have been most successful in reducing their own packaging costs start with sales, as most manufacturers do.

But production, manufacturing, traffic departments sit in on the sessions. The accounting department supplies cost figures to all. In some plants, the packaging engineer has been put directly under the head of the traffic department.

It could originate from the customer. An assembly plant recently requested that its parts suppliers standardize their shipments of a particular part. The suppliers now pay less in their own packaging costs, and the receiver has reduced man-hours in his receiving department by one-third, despite a 30 pct increase in incoming volume.



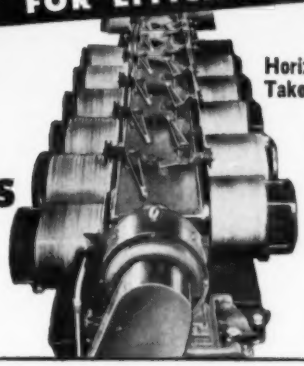
SAVINGS IN PACKAGING: Engineering your packaging can result in important savings. Cochran Foil Co. has unique method of packaging rolls of foil. Wirebound blanks in five different widths are used to hold rolls.

Vaughn

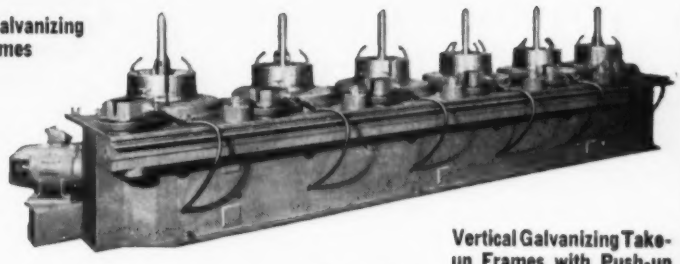
AUXILIARY EQUIPMENT

CORRECTLY DESIGNED—STURDILY BUILT FOR EFFICIENT WIRE MILL SERVICE

TAKE-UP FRAMES

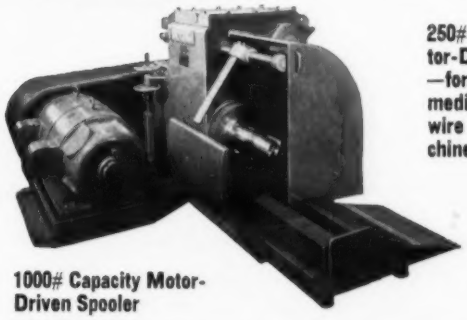


Horizontal Galvanizing Take-up Frames



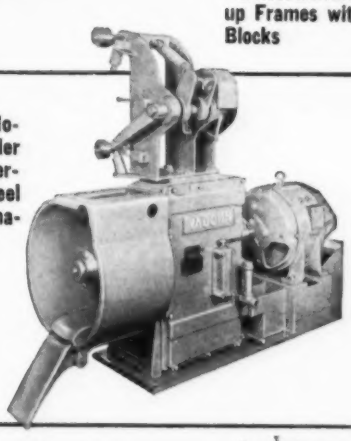
Vertical Galvanizing Take-up Frames with Push-up Blocks

SPOOLERS

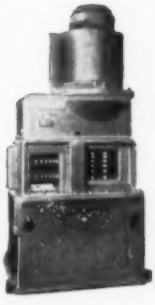


1000# Capacity Motor-Driven Spooler

250# Capacity Motor-Driven Spooler—for use with intermediate or fine steel wire drawing machines

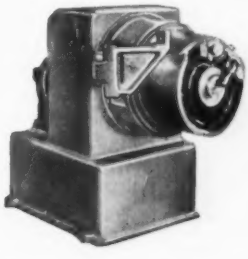


POINTERS and DIE STRINGERS

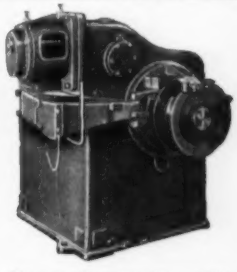


Extra-Heavy Four-Roll Pointer for 1¼" diameter low carbon steel rod

No. 1 Continuous Pointer

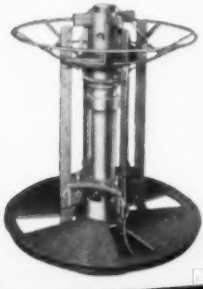


Die Stringer with Pointer

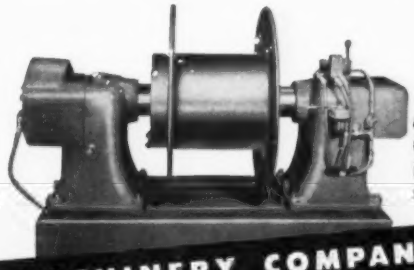


No. 1 Combination Die Stringer & Power Pointer

PAY-OFF MACHINES



Riding Type Block Stripping Spider used with Pallet and Pay-Off Ring as a Pay-Off Reel



4000# Capacity Pay-Off Stand for paying off from large spools

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Road Program Spurs Steel Demand

Roadbuilders will need 1.7 million tons of structurals per year until 1960.

Commerce Dept. has a table to figure how much steel road builders will take off the market in each state.

Calculations are based on products and past performance.

▪ Highway construction, under federal aid programs, is going to gulp a lot of steel in the next four years.

The outlook: Highway builders will take over 1.7 million tons of structural steel, and 1.26 million tons of reinforcing steel each year from 1957 through 1960 inclusive. In addition they are in the market for substantial tonnages of steel culvert pipe, and miscellaneous items—steel for guard rails, tubular pilings, and joint devices.

Figure the Market—Here's how to figure it: Federal and local governments will spend $25 billion for federal roads in the next four years, reports Bay E. Estes, Jr., director, staff administration, U. S. Steel Corp. This averages to $6¼ billion per year.

The Commerce Dept. has developed a tabulation of how much steel is used by roadbuilders per million dollars of contract construction. The system is based on an average of total sales to this market in 1953, 1954, and 1955.

FOR THE BIGGEST: Workmen at Trenton Works, American Steel & Wire Div., U. S. Steel, cut cable for Michigan's Mackinac Bridge. The 5-mile span will use 368 suspender ropes like these, from 17 to 722 ft in length. The world's greatest suspension bridge will be ready late in 1957.

Biggest Demand—Biggest structural item in demand by roadbuilders is wide flange shapes. On the basis of the Commerce Dept. formula, a total of 784,875 tons of these shapes will be bought for highway construction per year. Standard shapes will account for about 21 pct of roadbuilders structural buying, or 358,313 tons per year. About 238,875 tons of standard plates, and 170,625 tons of bearing piles will find their way to this market each year.

The smallest structural items on the roadbuilders shopping list are wide plates—about 102,375 tons per year, and sheet piles—51,188 tons each year.

Bar Needs — About 1,015,000 tons of reinforcing steel shipped to the roadbuilders will be bar for reinforcement of structures. The remaining 253,750 tons of reinforcing steel is wire fabric and other items for use in concrete pavement.

Commerce Dept. says it did not figure steel for concrete pipe reinforcing in its calculations. This would boost reinforcing steel used by about 6 pct.

Correction

The IRON AGE Financial Analysis opposite page 80, March 28, contained incorrect totals under the heading, "Provision for Federal Income Taxes."

These totals should be: For 1956, $992,530,516; for 1955, $1,033,-686,76. Percent change 1956 over 1955: minus 4.0.

More Lukens Capacity

A $33 million expansion program designed to boost ingot capacity by nearly 25 pct was announced by Lukens Steel Co. Major facilities included are a new electric furnace and a new four-high, 140-in. breakdown mill to serve the firm's 140-in. and 206-in. finishing mills.

In addition, the program calls for new soaking pits, ingot storage space, improvement of existing equipment and relocation of supporting facilities.

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Sharonsteel Quality

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BRIDGEPORT BRASS
COPPER ALLOY BULLETIN

Bridgeport Reporting New Developments in Copper-Brass Alloys and Metalworking Methods

Two Easily Machined Bridgeport Alloys That Offer Outstanding Advantages

by M. A. BUELL
Chief Staff Metallurgist

When everyday requirements call for dependable, fast-cutting rod, consideration should be given to two outstanding free-cutting alloys:

Bridgeport Alloy No. 6, the standard free-cutting brass rod, has exceptionally free-machining qualities. Containing 61% copper, 3.4% lead and 35.6% zinc, it has a uniform composition and can be finished to extremely close tolerances.

Bridgeport Tellurium Copper Alloy No. 112 offers unusually good machinability – 90 as compared to 100 for free-cutting brass Alloy No. 6 – but it also has extremely high electrical and thermal conductivity ratings as well as unusually high resistance to corrosion.

Tellurium Copper No. 112 is ideal for all types of electrical parts, welding torch and soldering iron tips, as well as any other heat- and electrical-conducting parts requiring considerable machining.

Comparative ratings of each alloy are given below.

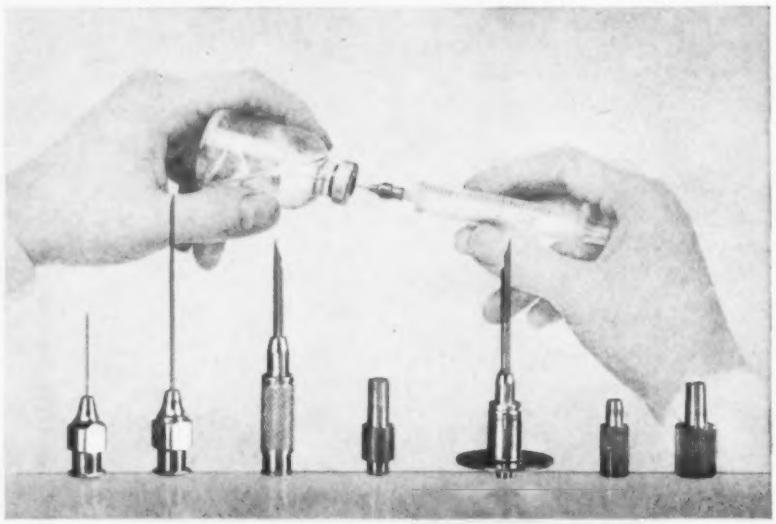
	Free-Machining Brass No. 6	Tellurium Copper No. 112
Thermal Conductivity*	67	204
Electrical Conductivity**	26	90
Machinability Rating	100	90
Cold-Working	Poor	Good
Hot-Working	Fair	Good
Hot-Working Range °F	1300-1450	1400-1600

*Btu/sq ft/ft/hr/°F @ 68° F
**% IACS @ 68° F Soft

Quick Way To Solve Your Metals Problems

Brass, copper and bronze alloys are all available in a widely varying range and combination of characteristics. Some are free-cutting, some have unusual ductility, others intrinsic hardness and still others high tensile strength. For best results, however, the metal should be matched to the job, both from the standpoint of machining as well as eventual product use. An easy way to get the answer to these questions is to talk over your metals selection problems with your Bridgeport salesman. Backed by Bridgeport's Technical Service, he can give you the finest possible help in solving your metals problem.

Free-Cutting Bridgeport Brass Plays Vital Role In Manufacture Of High-Precision Hypodermic Needles



Roehr Products Company, Inc., Waterbury, Connecticut, and Deland, Florida, manufactures over 1000 different types of hypodermic needles for every kind of medical and veterinary use. Each needle is designed and manufactured to high precision standards and to meet exacting tolerances on inside and outside diameters, finish and concentricity.

Hub Requirements

The hubs – an extremely important part of the needle from the point of view of exact fit – are made of Bridgeport Free-Machining Brass Rod, Alloy No. 6. Hub needle holes range from .018" to .085". Hubs are secured to the needles in a single press operation. In securing the needles to the hub it is imperative to avoid exerting excessive pressure – otherwise the needle walls would be pressed together and the needle would be constricted and useless. At the same time, the closure of the hub around the needle must be perfectly air- and liquid-tight. Each finished needle is tested under 45 pounds of pressure between the needle and the syringe.

Free-Machining Brass Is Versatile

The adaptability of Alloy No. 6 to the precise requirements of hypodermic needle manufacture is but another of the increasing number of jobs that this all-around alloy does so well. Its outstanding corrosion resistance is especially important in medical and pharmaceutical use. Its affinity for plating is another quality that governs its use in these instruments.

Wide Number of Uses

Many millions of needles are manufactured annually by Roehr—each must be flawless. Vaccine programs, blood banks, hospitals, doctors, veterinarians, research organizations, pharmaceutical houses – all must be sure that the needles they use are perfect in every respect.

Worth Investigating

Perhaps your present or future manufacturing or fabricating needs are not so exacting as Roehr's – perhaps they are more so. In either case, it will pay you to look into the impressive possibilities of Bridgeport Free-Machining Brass. Your Bridgeport salesman, with Bridgeport Technical Service behind him, will be glad to help. Call him.

BRIDGEPORT BRASS

Bridgeport Brass Company, Bridgeport 2, Connecticut, Offices in Principal Cities
In Canada: Noranda Copper and Brass Limited, Montreal

Dr. Lawrence R. Hafstad

Making Basic Research Pay Off

A scientist must have complete freedom of inquiry, says this research executive.

Regardless of practical application, a researcher's work should proceed unhampered.

His theories are beefing up General Motors' prospects for continued industrial predominance.

Dr. Lawrence R. Hafstad: Industry can use a more basic approach.

▪ When General Motors Corp. hired Dr. Lawrence R. Hafstad as vice president in charge of research in September, 1955, rumor had it his job was to design an atomic-powered automobile. The rumor was a logical one, considering Dr. Hafstad's background as an engineer, nuclear physicist, and scientific administrator, primarily atomic.

But to inquisitive reporters and editors he said: "I could give you a two-hour lecture on why you can't have an atomic car." It settled the question. Apparently, what GM management saw in Dr. Hafstad was far more fundamental than development of a product.

Defines Research Function—After the reporters got to know him, they saw for themselves. Dr. Hafstad has a clear-cut philosophy on the role research has in industry. He believes the scientists' "free-wheeling approach" is vital to industrial progress because, he says, some key industries are operating close to the frontiers of human knowledge in the physical sciences.

"It is a proper function for industry to do basic research — a proper function but not a responsibility," he says. "The responsibility lies with the universities and government laboratories . . . Industry should support basic science as its normal contribution to society, but its obligation is to produce better products and step up the efficiency of production."

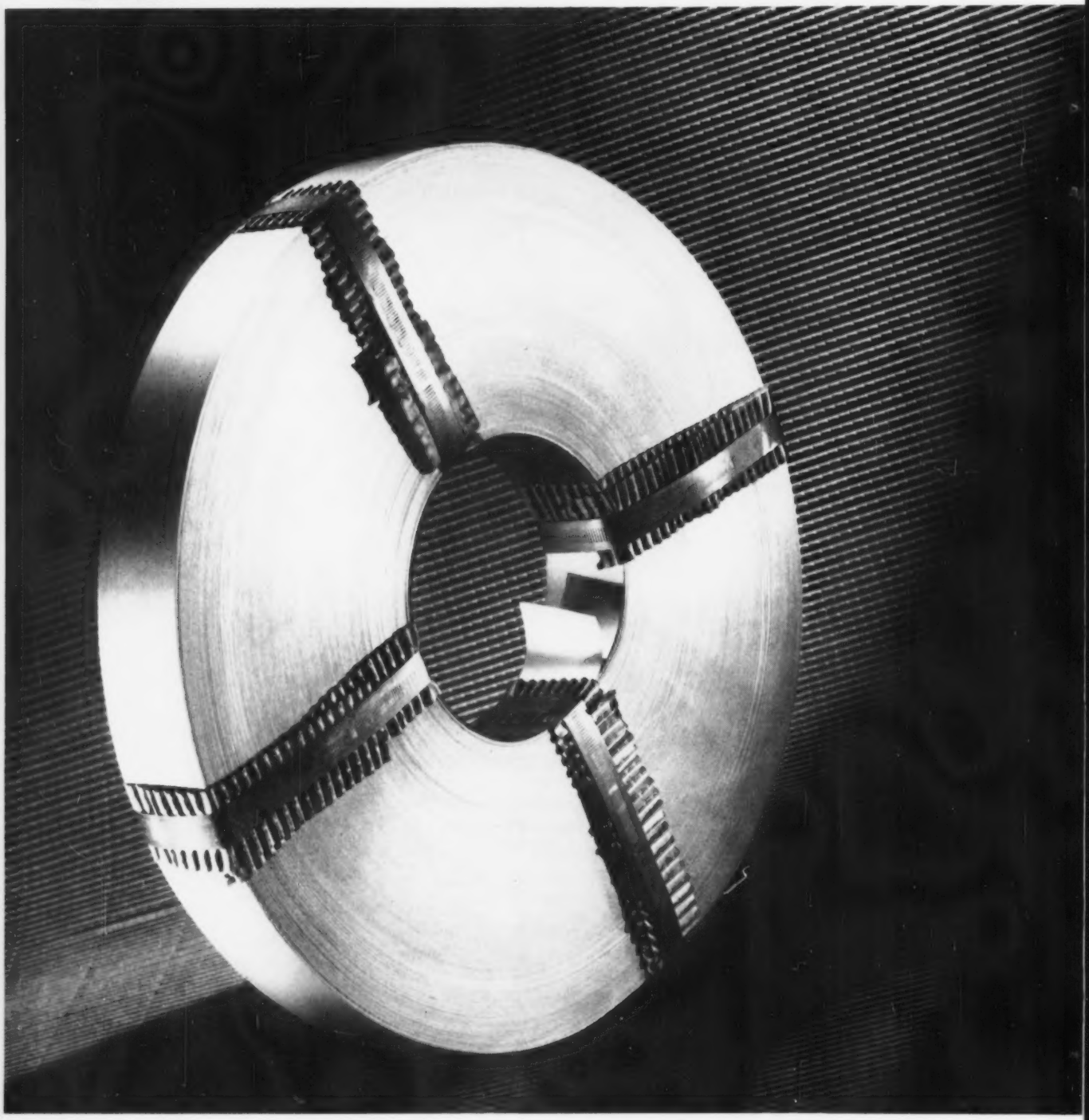
Staff Gets Leeway—To his staff of 1500 at GM's huge Technical Center in Detroit, Dr. Hafstad is a friendly, completely unaffected man who works in his shirtsleeves. He credits his staffers with intelligence and, insofar as possible, leaves them alone.

Dr. Hafstad describes himself basically as an engineer. But he had scarcely picked up his electrical engineer's sheepskin at the University of Minnesota in 1926 than he was off to the scientific races. "I got acquainted with the physicists," he recalls, "and they seemed to know the answers to everything." He joined them and, over the years, he has come up with a lot of his own answers. The literature of physics contains a fair share of papers authored by L. R. Hafstad.

Time Out For Leisure—When spare time unexpectedly occurs, an outcropping of the Minnesota heritage appears; Dr. Hafstad heads for a ski trail or skating site. In the summer, he does some farming.

Whether skiing or plowing, his primary concern is what he considers industry's biggest research problem—how to keep a scientist a scientist.

CMP RESTRICTED SPECIFICATION COLD ROLLED STRIP STEEL



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CMP

How to Use Employment Figures

Employment figures aren't just statistics to file or throw in the waste basket.

They can point out what areas of business are on the upgrade, or where orders are falling off.

■ Keep your eye on employment figures and forecasts. They frequently can supply business tips in advance of other economic indicators.

You don't have to be told that high employment means business. Employment rates can easily be correlated with consumer spending, gross national product and other sets of statistics that show the state of the economy.

Tells Where—But a closer look at employment records can be informative in an even more important area. They can show where business is going to be good, what segments of the economy will be good customers, what may be in for a slow period.

Geographically, the Bureau of Employment Security of the Dept. of Labor reports that job gains are expected by employers in almost all sections of the country in the spring months.

Record Employment — Nonagricultural employment was already at a record rate in March, with 51.3 million workers employed in industry, a gain of 150,000 over February and 800,000 in March.

Job increases are expected in construction, trade and service, as well as the seasonal industries.

Little Change in Steel—On the major industry side, more jobs will be filled in expansion of the aircraft industry. Little change is expected in either automobiles or steel.

This confirms the position of those who do not forecast a significant decline insteel, but predict a stable steel operating rate through the second quarter.

But it also indicates that a spring auto production surge is not likely. There is little intention of any automaker to put on more workers or add to overtime. Rather, it points to a steady second quarter with good production, few, if any, layoffs.

Building Holds Record Pace

Good Start—In line with most predictions of a record year in construction, it got off to a good start with a record first quarter.

There had been very few doubts of the construction industry's ability to come up to record expectations. Continued good business has resulted in most expansion programs going forward, if at a slightly less feverish pace than a year ago.

In spite of declines in housing, stores and farm buildings, value of new construction in March reached $3,172 million, a new high for the month. It also brought a first quarter record, which saw building at an annual rate (seasonally adjusted) of $44.8 billion.

Behind Expectations—This compares with the corresponding rate of $44.4 billion for the previous quarter and $44.3 billion actual expenditures for the year 1956.

However, the first quarter spending of $9,157 million was only a 4 pct increase over the first quarter 1956 figure. This is obviously slightly, but significantly, under the 6.5 rate of increase widely predicted.

There is no evidence right now to indicate whether the 4 pct increase will hold through the year, or whether the spring and summer construction booms will see it come up to the expected rate.

UAW Puts Emphasis on Pay

Keep It Coming—If the thinking prevalent at the recent United Automobile Workers convention means anything, plain, old fashioned money is back as the most important union goal.

The short work week will get a lot of attention. But most workers are thinking of time-and-a-half for Friday, not a three-day weekend.

The principle of supplemental unemployment benefits is established. Pensions are a fact. The goals of a sociological nature will now be sidetracked for a time. Instead, a fatter paycheck is the prime target.

Too Many Firsts—This does not represent the thinking of all top UAW leaders. But they are sensitive to rank and file thinking.

Particularly in the UAW, many of the workers believe they have spearheaded campaigns line the supplemental unemployment benefits at the expense of pay raises. Then, they watched other unions win the fringes without a fight, plus larger pay increases.

AUTOMOTIVE

Behind Chrysler's Labor Hassle

A Showdown With UAW May Be Near

The UAW convention at Atlantic City brought the issues to a head. Cries of "speedup" were loudest.

But will union officials call a strike that could be disastrous to the corporation?

Internal union strife complicates the picture. — By T. L. Carry.

▪ The long standing feud between the United Automobile Workers and Chrysler Corp. may be coming to a real showdown.

Action last week in which Chrysler workers were ordered to refuse to work overtime is only one of a series of incidents. But in defying the union's own contract, Norman Matthews, UAW vice president in charge of the Chrysler divisions, underlined the long term bitterness.

Speedup Charges—Relations between the UAW and Chrysler have not been good for a long time. But they have become strained to the breaking point since the 1957 model run began.

The fever - producing word "speedup" has been thrown around with frequency. Statements by Chrysler officials have been interpreted as indicating UAW officials had agreed to increased productivity. Heated denials have not eased the situation.

Overtime a Weapon—Focal point was the strike at the Maywood, Calif., assembly plant. This plant was closed down over a dispute over auto production rate. At failure to reach a settlement, Mr. Matthews pulled his workers off overtime.

This was interpreted by many as a grandstand play. Second quarter production schedules call for very little overtime. Only Chrysler Div. and some other plants were on moderate overtime.

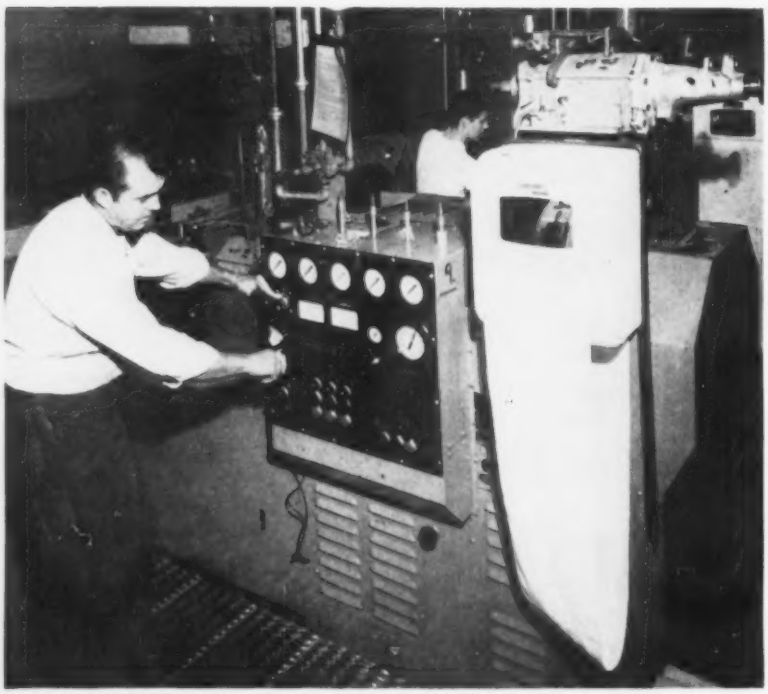
Strike Talk Mounts—Late last week it was indicated that talks were scheduled on the Maywood plant issue. But at least two other Chrysler union locals had also voted to strike. Workers at the company's main Highland Park plant had voted a strike last November. Dodge forge plant Local 47 also approved a strike vote.

The Chrysler issue even reached the floor of the UAW convention at Atlantic City last week where Chrysler delegates worked the alleged speedup into every debate.

Reuther's Blessings — With a heavy gavel, Walter Reuther, UAW president, attempted to keep the Chrysler issue from sidetracking the dues increase (from $2.50 to $3.00 per month) and other issues.

But, he told the cheering delegates, the UAW executive council "has never failed to authorize a strike" over a speedup. He virtually gave the go-ahead to Chrysler locals to force the issue.

There are more things at stake than isolated alleged speedups. UAW delegates at the convention



CLEAN START: Roller towels at the right of each testing station in Chrysler's Kokomo, Ind., transmission plant, allow operators to keep hands clean. It helps keep dust and dirt at a minimum, improves quality control.

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One of the leading manufacturers of machinery and equipment for the mining industry, employs the Bullard Spacer Table to locate parts for drilling, reaming and tapping.

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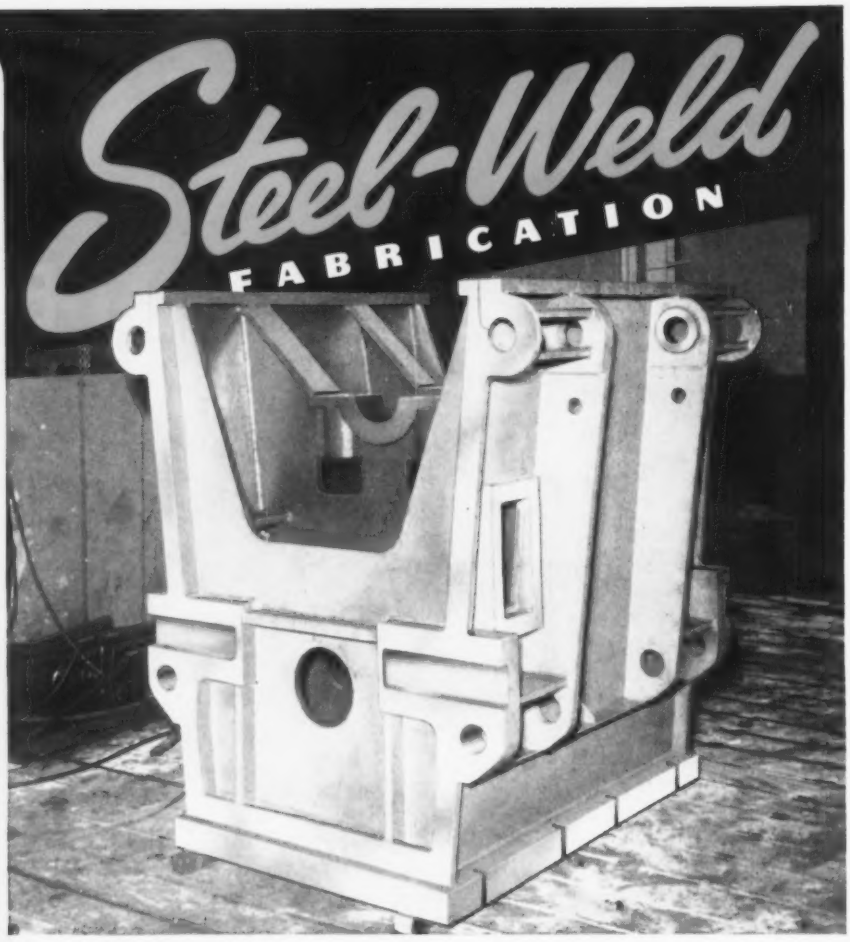
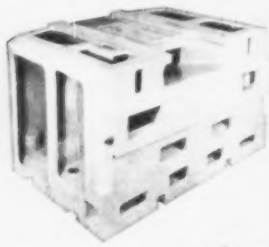
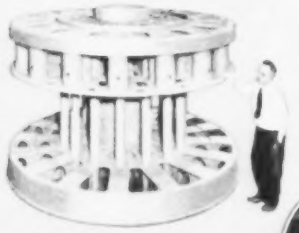
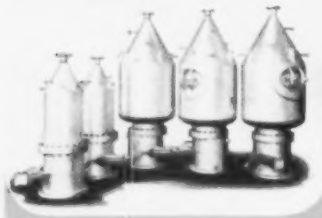
Steel-Weld FABRICATION









Use WELDED STEEL for Greater Strength with Less Weight!

The 35-Ton Weldment above is the Center Section of a three-section Bed for a large Underdrive Press. This piece, and the units illustrated at the left, are typical of thousands of Steel-Weld Fabricated parts and assemblies produced by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. It is possible that you, too, could benefit by the economies and other advantages offered by welded steel components in your product. In any type of heavy machinery there are parts and sub-assemblies that can be produced more economically and more satisfactorily in welded steel, because, in weldments you get greater strength with less weight, plus the additional advantages of greater rigidity and predictability. Before you place an order for weldments, you will want to discuss your requirements with Mahon . . . because here is a unique source for welded steel in any form . . . a reliable and responsible source with complete facilities for design engineering, fabricating, machining and assembling . . . a source where advanced fabricating techniques are supplemented by craftsmanship which assures you a finer appearing product embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information, or, better still, have a Mahon sales engineer call at your convenience.

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Automotive Production

WEEK ENDING	CARS	TRUCKS
April 13, 1957	126,707	23,810
April 6, 1957	130,318	23,896
April 14, 1956	135,918	24,242
April 7, 1957	133,223	24,308
TO DATE 1957	2,049,000	323,944
TO DATE 1956	2,012,076	362,218

*Estimated. Source: *Ward's Reports*

made no secret that one objective is to embarrass Chrysler personnel executives.

Labor Costs Critical—It takes more than allegations to determine to what extent Chrysler had improved worker efficiency. But in the tough competition among the Big Three, a lag in worker output or an increase in labor costs is fatal.

Many of the problems of Studebaker, Packard, Kaiser, Nash and other now merged or forgotton auto makers were traced directly to unfavorable worker productivity compared with competitors.

Union Politics Figures—Another factor complicating the issue is factionalism within Chrysler locals. The "outs" were more than eager to seize the speedup issue, particularly in view of the charges of collusion by union leadership, as a political tool.

Local 47, Dodge forge plant, delegates were outspoken at Atlantic City in criticizing their leadership.

"I'd be willing to raise the dues to $5 if we could get some decent leadership," one Local 47 delegate declared in the dues debate.

The Chrysler issue isn't likely to cause any break in UAW solidarity at other than the local level. But it is a serious and deep conflict between the UAW and Chrysler.

It's generally accepted that the UAW will never use Chrysler as a guinea-pig in a pattern strike, such as going after the guaranteed annual wage or short work week. In the company's present situation, such a thing could be fatal. But the UAW has no sympathy where work standards or such inflammatory charges as speedup are concerned.

Ford Div. Introduces Retractable Hardtop

Ford's Skyliner, the first retractable hardtop to be mass-produced, was introduced in dealer show rooms last week. The car has an all-steel top that retracts into the trunk area after the driver presses a button on the instrument panel.

The Skyliner breaks tradition in several directions.

First is its price. Suggested list is $2,702. Ford claims that there are only four other conventional convertibles in the industry that are priced lower. The price announcement came as somewhat of a surprise to the industry inasmuch as it was generally thought that the cost would be much higher.

Must Have Volume — Actually, Ford says that it would have been if the company had not broken the tradition of introducing an innovation on a luxury car. Originally, the Skyliner was scheduled for introduction on one of the company's higher priced cars. It was finally decided, however, that production of the vehicle would only be economically possible on a high volume automobile.

The steel-top convertible also opens up a new avenue for automotive body stylists to pursue. R. S. McNamara, Ford Div. general manager, says that the car will influence future styling more than any other body development in recent history.

Big Plans Ahead—The statement contains the hint that, now that the principle of the retractable steel top has been established, it may be only a matter of time before engineers and stylists can combine their talents to produce sedans and even station wagons along the same lines.

Ford plans to produce over 20,000 of the vehicles in the first year. The car is being made at five of Ford's 15 assembly plants but it is assumed that production can be switched to other plants if the demand calls for it.

Easy To Assemble—Tooling and engineering for the car cost close to $20 million. Part of the outlay was for special small jigs used in production. It is possible, however, to assemble the body on the same fixture used for other Fords.

THE BULL OF THE WOODS — By J. R. Williams

I THINK THAT MEMORANDA STUFF IS JUST A HABIT LIKE SMOKIN' OR DRINKIN'! HE WENT UP TO LOOK AT TH' JOB AN' IS NOW JOTTIN' DOWN A MEMORANDUM THAT TH' MACHINE NEEDS A NEW LADDER!
WELL, I DON'T KNOW WHY THEY EVER MADE A GUY A FOREMAN WHO CAN'T REMEMBER TILL HE GITS TO TH' OFFICE THAT HE NEAR GOT KILLED A MINUTE AGO!
J.R.WILLIAMS
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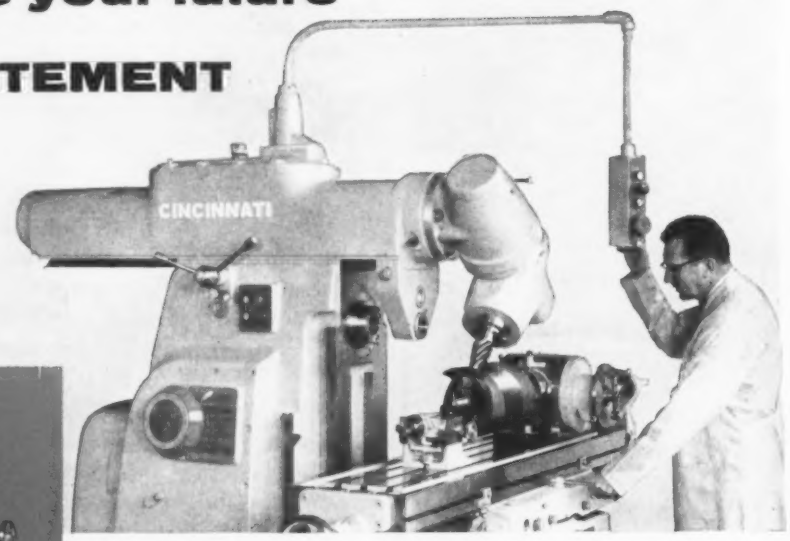
THE MEMORIZER
4-17

DIAL TYPES

will improve your future

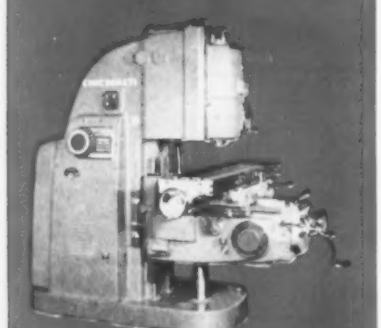
PROFIT STATEMENT



Universal Dial Type Milling Machine, equipped with Independent Overhead Spindle Attachment

CINCINNATI

Plain Dial Type Milling Machine



Vertical Dial Type Milling Machine

DIAL TYPE LINE		table traverse	main drive	automatic table cycles available
No. 2	Plain	28"	10 hp	yes
	Universal			no
	Vertical			yes
No. 3	Plain	34"	15 hp	yes
	Universal			no
	Vertical			yes
No. 4	Plain	42"	20 hp	yes
	Universal			no
	Vertical			yes

The profit you make or would like to make today and several years hence may well depend upon the machine tools in your shop. Are they contributing their full share to the profit statement? Compare your milling operations, for example, with the results obtainable when assigned to the latest CINCINNATI® Dial Type Milling Machines. These machines have the potential to produce faster, more accurately and at lower cost than any other equipment in their classification. A few reasons why include:

Push-button front and rear selection of spindle speeds . . . power front and rear selection of feeds, 3/8" to 90" per min. . . . automatic backlash eliminator . . . Dynapoise chatter-damping overarm . . . automatic table feed cycles, if desired, for plain and vertical machines.

May we tell you more about CINCINNATI Dial Type Milling Machines? A complete list of Dial Type advantages and specifications is contained in catalog No. M-1915-2. Brief data will be found in Sweet's.

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Trade Groups Face Tax Probe

U.S. Questions "Nonprofit" Activities

With cuts rumored on the way, the U. S. will have to squeeze all it can from the tax structure.

The Internal Revenue Service is leaving few stones unturned in its search for evaders.

Unwittingly, your trade group may fall into this category — By G. H. Baker.

▪ The Internal Revenue Service is taking a close look at the "nonprofit" claims (for tax purposes) of some business associations.

IRS believes some organizations are making improper use of their "nonprofit" classifications. This is particularly true of associations that have branched out into lines of activity not directly related to their main purpose.

Probes Will Follow — New tax regulations to be issued soon will specify that all organizations will have to start paying taxes on that part of their income derived from "unrelated" activities.

The main point the new regulations will establish is that income of unrelated activities is now taxable. After the regulations are issued, the IRS then will move to challenge the "nonprofit" status that is being improperly claimed.

Some Typical Cases — Here are some cases (names deleted) now being examined by IRS lawyers:

* A trade association publishes a magazine for its members. Is the magazine a "related activity?"

* A religious order owns and operates a broadcasting station. Is this a related activity?

* Another religious order operates a winery. Is this a related business?

* Many fraternal organizations rent sleeping rooms and dining rooms to members in competition with taxpaying commercial hotels. Is the renting of rooms related?

Decisions of the IRS can, of course, be appealed to the courts. Undoubtedly, many of the upcoming IRS decisions will have to be settled finally by the courts.

ICC Eyes 'Hot Cargoes'

Companies involved in labor disputes may have less trouble in getting their goods hauled by trucks.

Big hitch in the handling of products from these concerns is the "hot cargo" clause in many Teamsters Union contracts. This clause forces employers to agree that union drivers may refuse to move goods from companies cited by the union.

Now an ICC examiner recommends that truck lines lose their operating permits if they decline to accept freight from other truckers, on union orders.

Red Trade Ban May Be Eased

Exports Needed—Some of the Free World's self-imposed restrictions against trading with Communist China probably will be eased soon.

Clamor from Britain and Japan for increased volume of foreign trade is the chief reason for the coming relaxation in export rules. Each of these two nations desperately needs to build up export business in order to keep factories running and to maintain a balance of foreign payments.

Agreed at Bermuda—At the recent Eisenhower-MacMillan talks in Bermuda, agreement was reached that a relaxation in rules against trading with China would be "desirable." Mr. Eisenhower assured Mr. MacMillan that he would urge the U. S. Congress to soften the present rules.

Since the outbreak of the Korean war in 1950, the United States and nearly all of the Free World have refused to trade with China. The reasoning is that Red China's ability to make war could be strengthened substantially if she could buy some manufactured goods on the outside instead of having to manufacture all her needs at home.

Congress Is Careful—The attitude of Congress still is firmly against any relaxation of rules relating to the shipment of "strategic" goods to China. There is virtually no chance that the Congress will okay the export of planes, military vehicles or guns to China. But shipments of food, of textiles, and so-called "nonmilitary" goods probably will be approved.

Aid for Poland—U. S. aid for Communist-dominated Poland is another strong prospect. Talks have been underway here for weeks over the details of U. S. aid to Poland.

The State Dept. offered the Poles $75 million worth of U. S. goods and services.

Kaiser Will Double Capacity

Steel Firm Votes $194 Million for Expansion

Program, set for '58 windup, will make firm biggest steel maker in West.

Here's where the new expansion funds are going to be spent. —By R. R. Kay.

▪ More steel is on the way for the Farwestern market. Kaiser Steel Corp., Oakland, Calif., will spend $81 million to further expand its major facilities. That's on top of the $113 million expansion now about 35 pct completed. All together, the program will cost $194 million—and should be finished next year.

Largest in the West—The Fontana (Calif.) works capacity will then double—from 1.5 million to 3 million ingot tons per year. This will make the company the largest steelmaker west of the Mississippi.

Company announcement of the expansion confirms an IRON AGE advance report on the move. (See West Coast, Mar. 28, 1957 issue, p. 97.)

Kaiser Steel aims to provide the growing Farwest with more of the finished products it needs most: plate, sheet, tin plate, and pipe.

Where It'll Go—This new $81 million will go for: a fourth blast furnace at Fontana; 90 new coke ovens; a third oxygen steelmaking furnace; a second sinter plant; two more soaking pits; conversion of 110 in. plate mill to 144 in.; and improvements at the company's iron ore and coal mines.

The $194 million program will make new jobs for 2700 people.

MOVING DAY: In construction of new Kaiser Aluminum and Chemical Corp. sheet, plate and foil mill at Ravenswood, W. Va., an all-aluminum welded crane moves a 203-ton housing which will hold mill rolls.

West Coast Briefs

Discount all the talk you hear that Crucible Steel Co. of America is coming to the Coast to make steel. In an interview with THE IRON AGE, Joel Hunter, Crucible's president, said his company is certainly eyeing the market. But any steelmaking plans are a long way off.

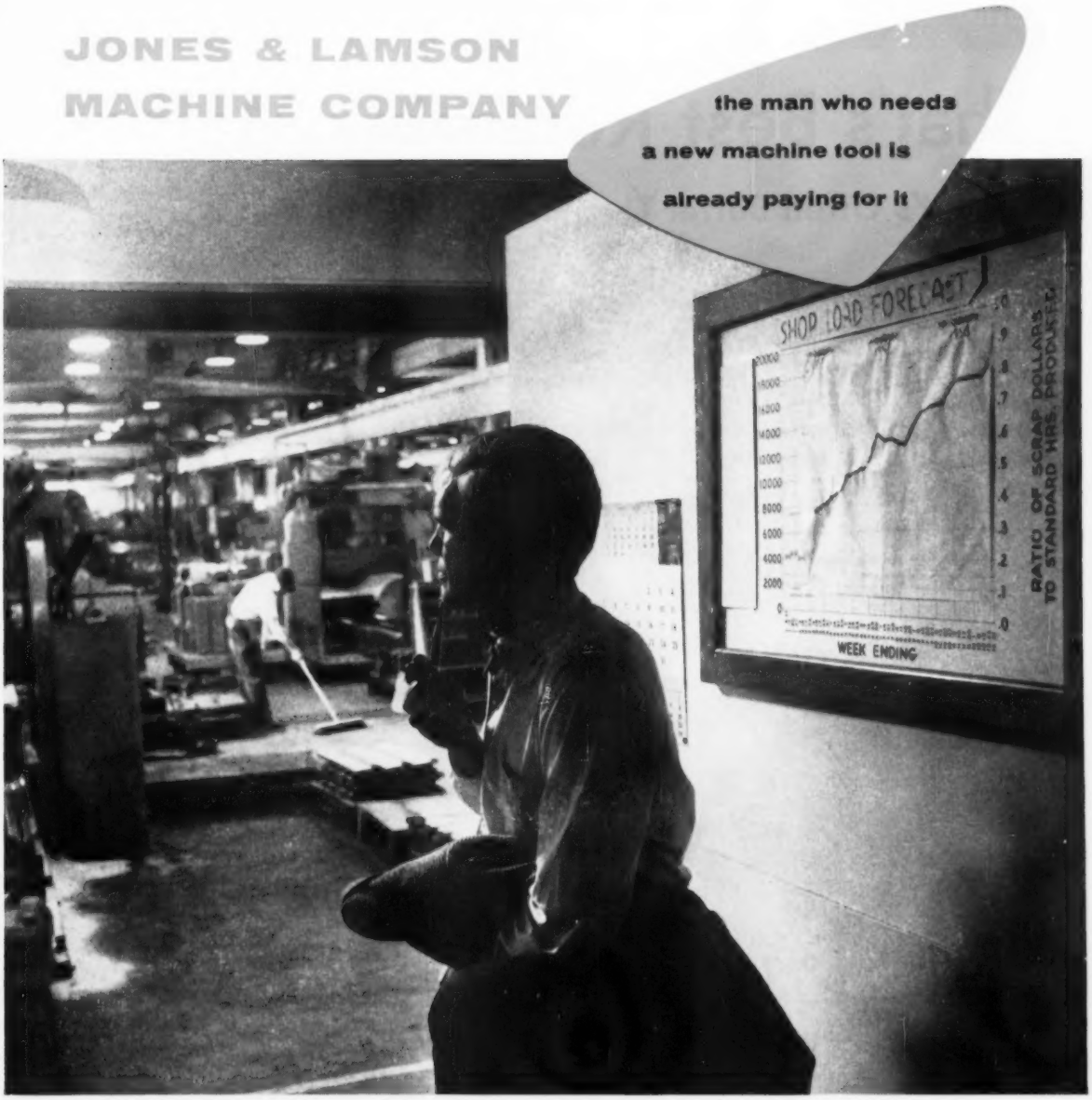
Shipbuilding on the West Coast got a healthy shot in the arm when Seattle's Todd Shipyard Corp. landed an $18 million contract for a guided-missile destroyer. The 431-ft ship, with aluminum superstructure and steam turbines, will carry Tartar surface-to-air missiles.

And in San Diego, National Steel & Shipbuilding Corp. came up with a low bid for a $5.5 million job. It's for an ocean surveying ship.

Natural gas progress report: Canadian gas from the Peace River area of Alberta will be flowing into the Pacific Northwest before fall. The job is ahead of schedule, says Westcoast Transmission Co. president Frank McMahon.

These West Coast companies are expanding: Columbia Aluminum Products Co.; Portland, Ore.; Manufacturer's Service, Inc., El Monte, Calif., metal finishing shop; Los Angeles Stamping & Manufacturing Co., Los Angeles.

JONES & LAMSON
MACHINE COMPANY


the man who needs
a new machine tool is
already paying for it
SHOP LOAD FORECAST
WEEK ENDING
RATIO OF SCRAP DOLLARS TO STANDARD HRS. PRODUCED

There's no time like the future

There just isn't any way of predicting the "when" or "whence" of future orders. Things happen fast nowadays, and twists of fortune can transmute production dreams into nightmares in a twinkling.

There's one thing sure about the future, though, and we can all bank on it: tomorrow, next year and ten years from now, the competitive edge will be held by those who are equipped to turn out the best possible products at lowest possible cost.

The most advanced machine tools and methods are nothing less than *a vital requisite of survival*. Good sense, therefore, dictates that you keep abreast of the latest developments in production.

We'd like to help you do just that. Liberal finance plans are available.

Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Optical Comparators • Thread Tools • Thread & Form Grinders

MACHINE TOOLS

What's Best Replacing Method?

Judgment's Often Better Than Statistics

Formulas aren't the right guide in deciding when a machine tool is over the hill, says British expert.

It's a problem calling for foresight and imagination on the part of machine owner.

Three basic reasons for replacing existing equipment are listed.—By E. J. Egan, Jr.

▪ Can a simple equipment replacement formula provide a wholly reliable answer to the question of when is a machine tool obsolete? "No," says Mr. C. W. Griffiths, a chartered accountant for the British firm of Joseph Lucas (Industries), Ltd.

He recently told the British Institution of Mechanical Engineers that, "No simple formula exists, or is ever likely to exist, to replace the judgment of engineers."

When to Replace—In his opinion, despite all the statistical data that can be offered in support of a new equipment selection, certain imponderables will remain imponderable. He feels that economical and wise replacement will become more of a challenge to foresight and imagination, and less of a problem that can be solved by a formula.

Mr. Griffiths says there are three basic reasons for replacing existing equipment:

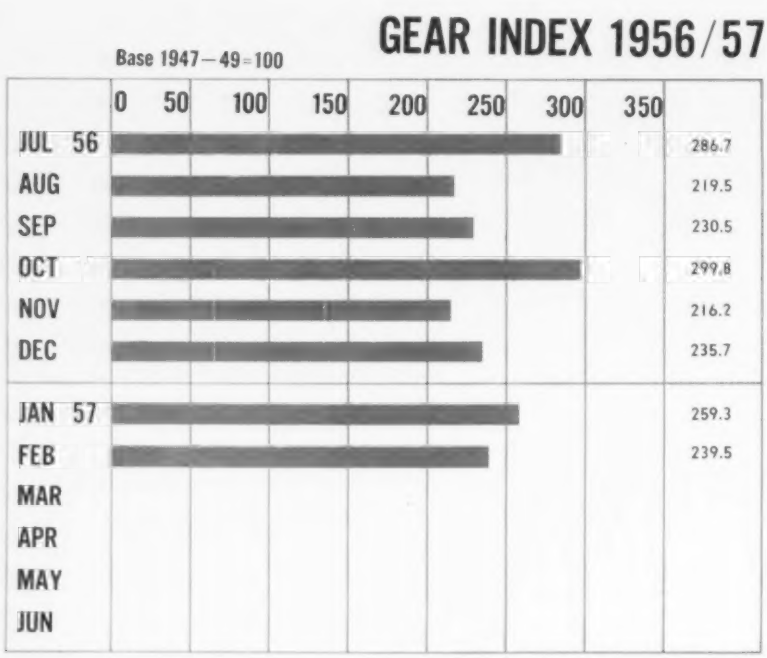
(1) When machines are worn to the point where they require excessive maintenance, break down frequently, or produce poor-quality work, and must be replaced on a type-for-type basis.

(2) When machines become obsolete through the availability of new, improved models.

(3) When machines become obsolete in the sense that entirely different manufacturing methods, equipment or materials offer the only way to reduce costs, or accommodate changes in product design.

Not Age Alone—He notes an interesting pattern in equipment replacement as an out-growth of industry's vigorous drive to cut machining and work-handling time. For example: "The type-for-type replacement of machines on an age or wear-and-tear basis is steadily giving way to replacement by improved or different machines."

And he cautions that displacement of the age factor by those of savings and productivity must be fully and faithfully reflected in depreciation policy. The reason, he says, is "to guard as carefully as possible against losses from obsolescence, and responsibility for bringing this to (management's) notice must rest largely with engineers."



Source: American Gear Manufacturers Assn.

Tool Engineers Meet

The 21st Annual Machine Tool Electrification Forum, sponsored by Westinghouse Electric Corp., will be held at the Statler Hotel in Buffalo, N. Y., April 24 and 25. Theme of this year's meeting is "Engineering for Tomorrow in the Machine Tool Industry."

As in previous years, the two-day program will feature panel discussions and an open forum.

JONES & LAMSON OPTICAL COMPARATORS

the man who needs a new machine tool is already paying for it

Rapid Inspection Between Operations Keeps Quality High, Scrap Low

Things start to happen when J & L Optical Comparators are put to work on production line inspection. Parts — even the most intricate ones — are inspected more easily and more rapidly than ever before. Measurement is precise to .0001". Parts which undergo several operations are speedily checked *at each stage* of manufacture. Any errors present in production operations are instantly revealed.

As a result of all this, production flow is faster and surer, product quality is kept on a higher level, and *scrap* volume takes a nose dive.

Investigate the possibilities that lie in using J & L Optical Comparators in *your* manufacturing. Send for our latest Comparator Catalog. JONES & LAMSON MACHINE COMPANY, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Optical Comparators • Thread Tools • Thread & Form Grinders

INDUSTRIAL BRIEFS

Amen—The second Presbyterian Church, Indianapolis, Ind., has contracted with Overly Mfg. Co., Greensburg, Pa., for one of the highest church spires ever to be entirely prefabricated. The spire, costing $70,000, will be 107 ft high, gothic design, made of lead coated copper.

Academic Horse Power — The Ford Foundation has granted the Graduate School of Administration, Carnegie Institute of Technology, Pittsburgh, $750,000 for research in the field of business administration. Two-thirds is an endowment, the interest of which will be used to bring outstanding experts in this field to Carnegie Tech for one to two year periods.

Permission Granted — Jones & Laughlin Steel Corp., Pittsburgh, is making extreme line casing, a seamless, tubular oil country product, under a licensing agreement with National Supply Co.

Campaign Bars—Three men received special commendation from the National Screw Machine Products Assn. Ernest A. Schonrock, president of Precision Screw Products Co., Los Angeles, and Charles W. Beck Jr., president of Beck Products Corp., Detroit, were awarded the association's Gold Micrometers. The NSMPA Merit Certificate was presented to Clarence A. Button, assistant to the executive vice president, Mueller Brass Co., Port Huron, Mich.

Getting Up Steam — ALCO Products is offering for immediate sale or lease about one-third of the buildings of its 113-acre Schenectady plant. The move is in line with plans to consolidate and modernize the company's locomotive building facilities. Buildings involved are surplus facilities which place an unduly heavy tax burden on the more productive property.

ELECTED: Clarence P. Sander, general superintendent, Vernon plant, Consolidated Western Steel Div., U. S. Steel, has been elected president of the American Welding Society. He takes office June 1.

And Two Make Ten — Loftus Engineering Corp., Pittsburgh, will build and install two ingot heating furnaces for Hojalata Y. Lamina, S.A., Monterrey, Mexico. This will make a total of 10 such units for this firm, all supplied by Loftus.

By a Landslide—Howard F. Park Jr., vice president, sales, General Steel Castings Corp., Granite City, Ill., was re-elected president of the Steel Founders' Society of America. B. P. Hammond, vice president, Eastern Casting Sales, Foundry and Mill Machinery Div., Blaw Knox Co., was elected vice president, and R. G. Parks, National Malleable and Steel Castings Co., Cleveland, treasurer.

California Caper—California operations of Aero Hydraulics Div. of Vickers Inc. have been moved from El Segundo, Calif., to a new plant at Torrance. The new 100,000-sq ft facility will accommodate engineering, sales, service and production of aircraft, missile and engine hydraulics systems and components.

Double Feature — Consolidated Electrodynamics Corp. has started construction of two buildings at Monrovia, Calif., to house laboratory, offices and plants of its Transducer and Systems Divisions. The $1.5 million development will occupy 13 acres of a site, formerly Monrovia airport property.

Get Tokens—Westinghouse Electric Corp. will build three 30,000 kva frequency changers and allied switchgear for the New York subways. The equipment, costing $4,856,400, will change ac power from 60 cycles to 25 cycles for the BMT and IRT lines. Units are scheduled to be delivered and installed in 1959.

High and Mighty—General Electric Co. will construct $83 million worth of electronic equipment for the U. S. Air Force. The work is in connection with guidance of the Atlas Intercontinental Ballistic Missile.

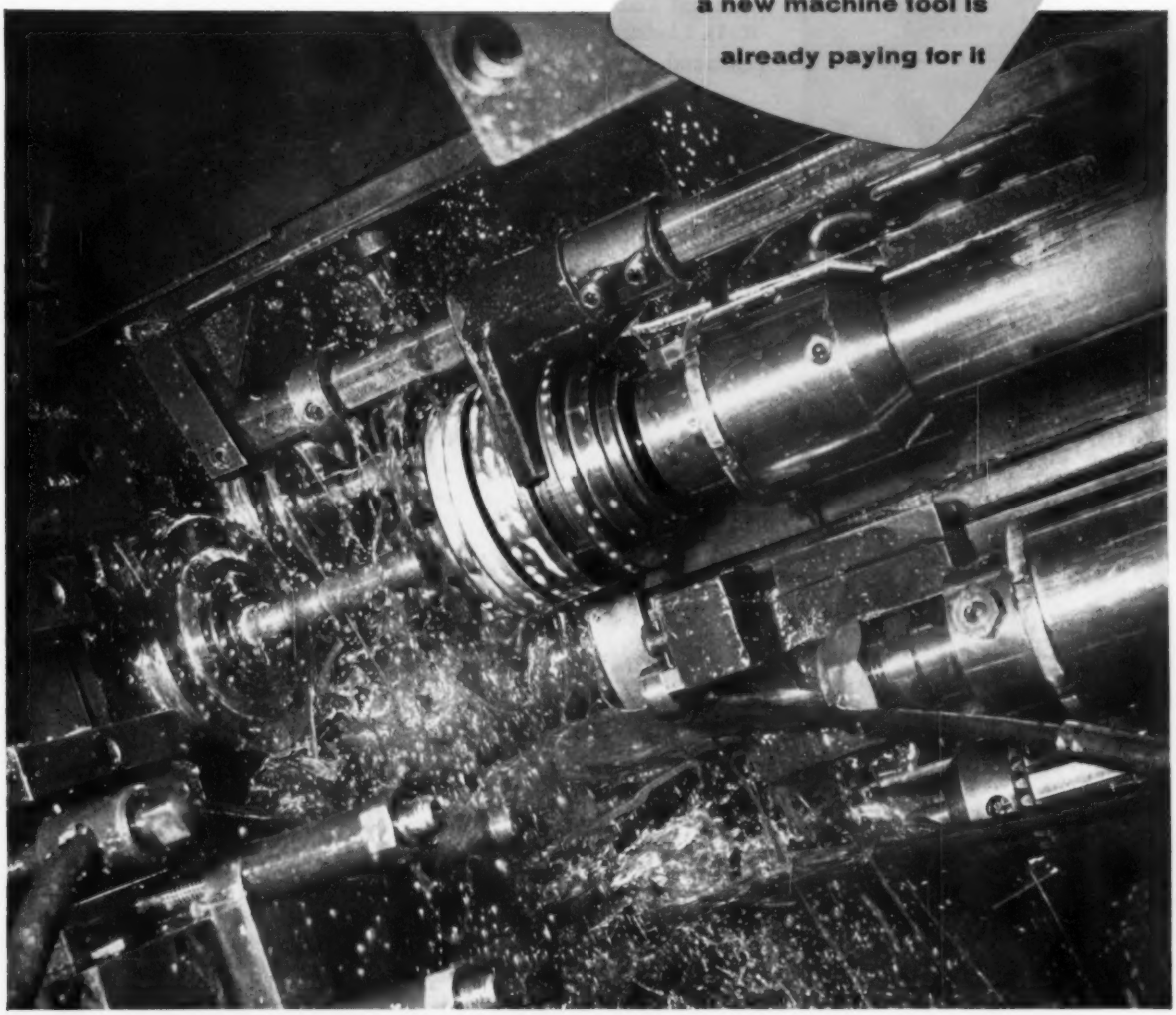
Spliced Cable — Rome Cable Corp., Rome, N. Y., has purchased plant, equipment and assets of T. J Cope, Inc., Collegeville, Pa. The N. Y. firm will expand its line to include conduit cable trays and racks, and other equipment from its new subsidiary.

It's Shocking—Avco Manufacturing Corp. will produce hypersonic shock tubes for industry and research facilities. The shock tube is capable of duplicating environmental conditions of flight in speed ranges up to 18,000 mph, 25 times the speed of sound. Tubes will be custom-made and installed, based on individual consultation and consignment.

Wear Your Overalls—A foundry conference aimed at the "man in the shop" is set for June 20-22 at Pennsylvania State University. Speakers and topics will be selected for applicability to practical foundry operation. For further information: T. Reed Ferguson, Extension Conference Center, Penn. State Univ., University Park, Pa.

JONES & LAMSON
THREAD TOOLS

the man who needs
a new machine tool is
already paying for it



J & L Revolving Tangent Die Heads Give Long-Run Economy, Guaranteed Accuracy

The efficiency of your threading operations rises sharply when you use J & L automatic opening Tangent Die Heads. Revolving types, similar to that illustrated, are available for multi-spindle automatics, drill presses and special machines.

Chasers are changed in mere seconds, without disturbing the die head *or chaser holders;* repetitive tripping permits automatic threading close-to-shoulder; one set of holders handles a full range of coarse, fine and multiple pitches; you get up to 30 foolproof resharpenings with every set of chasers. *And* Class III threads are guaranteed...*every time!*

J & L manufactures complete lines of die heads and chasers; accessories and sharpening equipment; collapsible and solid adjustable taps and chasers; the "Modern-Magic" chuck and automatic releasing stud setters. Send for Thread Tool Catalog. JONES & LAMSON MACHINE COMPANY, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Optical Comparators • Thread Tools • Thread & Form Grinders

M. Nielsen, elected president, The Babcock & Wilcox Co.

J. A. Over, elected vice president and division manager, Proto Tool Co., Jamestown Div., Pendelton Tool Industries.

W. J. Woolley, promoted to executive vice president, Henry Pratt Co., Chicago.

Lloyd G. Stewart, appointed district sales manager, Research-Cottrell Ltd., Canada.

Charles H. Schwerin, appointed manager, West Coast sales, Mackintosh-Hemphill and Rolling Mill Divisions, E. W. Bliss Co.

Ernest F. Dooley, appointed carbide tool engineer, Jarvis Corp., Middletown, Conn.

William D. Ross, appointed president, J. J. Tourek Mfg. Co., Chicago; **R. A. Burritt,** named vice president and factory manager.

Arthur T. West, named president, National Tool Co., Cleveland, and **R. D. Lindstrom,** elected vice president and general sales manager.

George C. Papp, appointed vice president in charge of sales, Prutton Corp., Cleveland.

E. J. McCormick, appointed sales manager of metal section, Wheeling Corrugating Co., Wheeling, W. Va.

Charles F. Hamilton, appointed supervisor of employee and community relations, Motor and Control Div., Westinghouse, Buffalo.

H. E. McPherson, appointed district sales manager, New York sales office, Republic Steel Corp.

Julian Silverberg, appointed senior welding engineer, Maytag Co., Newton, Iowa.

William A. Towle, appointed manager, employee relations, Westinghouse Electric Corp., East Pittsburgh, Pa.

Edward J. Martin, appointed administrator - employment and training, Crucible Steel Co., Pittsburgh.

Marvin G. Calhoun, named supervisor, bellows sales div., Robertshaw-Fulton Controls Co.

Robert C. Thompson, appointed superintendent of finishing at the plant 2, Maytag Co., Newton, Iowa.

Warren H. Thompson, named general supervisor, Sales Development Section, Construction Equipment Div., International Harvester Co., Melrose Park, Ill.

R. W. Couch, named manager, electrochemical research and development, Metal & Thermit Corp.

Carl R. Gloskey, named manager, Process Development Div., Metal & Thermit Corp.

Sidney A. Wood, appointed executive vice president, Wilbur B. Driver Co., Newark.

Other appointments include: **William J. Wind,** named senior vice president; **Norman P. Norlie,** sales vice president; **H. Clark Smith, Jr.,** vice president in charge of research and engineering; **Raymond O. Hallberg,** secretary; **Samuel Rankin,** treasurer; **Robert W. Judkins,**

JONES & LAMSON FORM GRINDERS

the man who needs a new machine tool is already paying for it

Full Versatility to Suit Your Needs... Both Manual and Automatic

By using the automatic handling device shown above, a J & L Model E Form Grinder can handle 113 pieces per hour. Four grinding wheels plunge grind in one operation, to very close tolerances.

Other Model E's along this assembly line are equipped for crush wheel, or diamond trueing; automatic or manual handling; chucking work, center work or shoe-type support, depending on the work to be done.

This is an example of how plunge form grinding is being used in many plants to perform a great variety of work. Its superiority over other methods offers great benefits, in terms of versatility, accuracy and speed. Learn how J & L Form Grinders can help improve *your* production.

Write for Form Grinder Catalog, JONES & LAMSON MACHINE COMPANY, 511 Clinton Street, Springfield, Vermont.

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named director of the company.

Dr. F. A. Lowenheim, named technical adviser, Metal & Thermit Corp., Rahway, N. J.

William M. Paradise, named purchasing agent for company's new mfg. plant. International Business Machines Corp., Burlington, Vt.

Arthur H. Wolfson, named manager, gage research, Pratt & Whitney Co., Inc., West Hartford, Conn.

Frederic S. Claghorn, named sales manager, Fletcher Foundry Div., Fletcher Works, Inc.

J. A. Over, elected vice president and division manager, Jamestown Div., Proto Tool Co., Jamestown, N. Y.

Harry D. Roach, appointed sales manager, St. Louis district, North American Refractories Co.; **Julian D. Dunbar, Jr.,** named warehouse salesman, Cleveland.

Edwin C. Murray, named plant manager, Portable Air Cooler and Heater, Inc., Chicago.

Wheelabrator Corp., Mishawaka, Ind., has made the following appointments: **Kenneth E. Blessing,** sales manager of Dust and Frame Div.; **L. W. Kohlmeyer,** manager of the New York office; **George F. Jones,** Chicago sales staff.

F. E. Engel, appointed personnel manager of The National Supply Co., Pittsburgh.

Henry R. Merrill, elected vice president, sales, Behr-Manning Co., Troy, N. Y.

Henry W. Reid, Jr., named manager of general accounting, Pratt & Whitney Co., Inc., West Hartford, Conn:; **William Hayes,** named supervisor of financial accounting.

Bruce Alexander, named manager, technical services, Washington, D. C., office, Blaw-Knox Co., Pittsburgh.

George H. Williamson, elected vice president in charge of West Coast activities, American Chemical Paint Co., Ambler, Pa.

John W. Daughters, appointed field engineer, Cincinnati Gilbert Machine Tool Co., Cincinnati, O.

Leo P. Gajda, elected vice president, engineering; and **Bruce M. Regan,** elected vice president, manufacturing, Snyder Tool & Engineering Co., Detroit.

Albert M. Dexter, named asst. to manager, Gage Div., Pratt & Whitney Co., Inc., West Hartford, Conn.

William D. Randolph, appointed general attorney, Fairbanks, Morse & Co., Chicago.

Frederick G. Riedel, appointed chief engineer, American Coils Co., Farmingdale, N. J.

Robert H. Hughey, named regional manager, southern sales, grinding wheels, A. P. deSanno & Son, Phoenixville, Pa.

Charles C. Brandon, appointed director, production and material control and purchasing, Rochester Products Div. of General Motors.

Bernard E. Ericson, named assistant to the vice president, engineering, Pittsburgh Steamship Div., U. S. Steel Corp.

Promotions at Wheeling Steel Corp's Steubenville, Ohio, Works include: **M. L. Bernstein,** named assistant general manager; **L. W. Moore,** appointed assistant to the

JONES & LAMSON
"AUTOMATION"

the man who needs
a new machine tool is
already paying for it

This tape-controlled table eliminates set-up time on small lots

It's natural enough, in a way, to associate "automation" with huge plants and their long, high-speed production lines.

We should also keep in mind, however, that certain "automation" techniques offer tremendous benefits to the *small job shop*. Jones & Lamson research and development have produced remarkable results in applying "automation" to small-lot production.

Are you interested in drastically cutting set-up and change-over time, and greatly increasing your small-lot flexibility? We'd be pleased to show you how the results of our intensive research and development programs can be put to good use in *your* operations.

Write for literature. JONES & LAMSON MACHINE COMPANY, 511 Clinton Street, Springfield, Vermont.

Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Optical Comparators • Thread Tools • Thread & Form Grinders

Photos courtesy of Columbus Dispatch

Kinnear Rolling Doors

Here's double-barreled doorway efficiency and protection!

A Kinnear Steel Rolling Door and Rolling Grille in the same opening! Both open *upward,* coiling into a small space above the doorway.

When the grille alone is closed, it bars intruders without blocking light, air, sound, or vision.

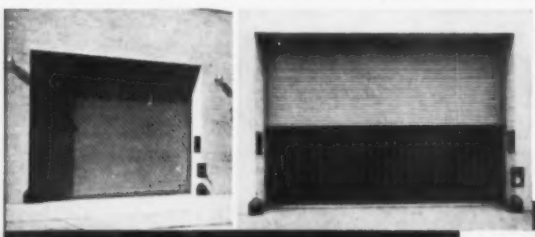
When the Kinnear Rolling Door is closed, its rugged curtain of interlocking steel slats gives extra protection against weather, intrusion, and fire.

With both door and grille closed, a *double* steel barrier repels vandals, thieves, or troublemakers.

Separately or together, the door and grille can be raised or lowered by push button. When opened, they clear the entire doorway, and stay completely out of the way. Whether opened, closed, or in action, they never take up usable floor, wall or ceiling space.

For safety, eye-appeal, efficiency and protection at doorways of any size, in new or old buildings, with any architecture or building material, you get top value with Kinnear Rolling Doors. Their *coiling upward action* has been proved by more than half a century of time-saving, space-saving, low-cost performance. Write today for full information.

HEAVILY Galvanized for lasting protection, Kinnear Steel Rolling Doors are thoroughly coated with 1.25 oz. of pure zinc per square foot of metal (ASTM Standards) then treated with Kinnear's special Paint Bond to assure quick firm full-coverage of field applied paint.



The neat, trim appearance of Kinnear Rolling Doors and Grilles is evident in the new and modern building housing the newspaper printing presses of the Columbus (Ohio) Dispatch.

KINNEAR
ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co.
FACTORIES
1760-80 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Cal.
Offices and Agents in All Principal Cities

general manager, utilities and development; **C. W. Drabers,** promoted to superintendent, openhearth dept.; and **G. P. Whitaker, Jr.,** appointed asst. superintendent. openhearth dept.

Bernard Campbell has joined Calstrip Steel Corp., Los Angeles, as assistant vice president, operations.

Frank W. Shriver, appointed asst. superintendent, industrial relations, Youngstown district, Republic Steel Corp.

Raymond A. Miller, Jr., appointed general plant manager, Hawthorne Metal Products Co., Royal Oak, Mich.

Weaver Barnett, named technical group engineer, Temco Aircraft Corp., Dallas.

Merle W. McLaughlin, appointed vice president, manufacturing, Copeland Refrigeration Corp., Sidney, Ohio.

A. E. Edwards, named field representative, Chromalloy Corp., Washington, Oregon, and Calif.

Ted Goellar, appointed assistant sales manager, Clearing Machine Corp., Hamilton, Ohio.

M. S. Rosenberger, named assistant chief engineer, Chevrolet Motor Div., engine and passenger car chassis design, Detroit.

Recent promotions at Wheeling Steel Corp.'s Beech Bottom Works and Steelcrete Factory, Beech Bot-

tom, W. Va., are: **Alex Glass,** named plant superintendent, Beech Bottom; **Elmer Nolte,** superintendent of maintenance and service dept., Beech Bottom; **E. J. Jugucki,** asst. superintendent of maintenance, Beech Bottom; **Harold Winters,** electrical sheet engineer, Beech Bottom; and **Charles L. Serig,** supervisor of personnel and training, both Beech Bottom Works and Steelcrete Factory.

Jack K. Fowlkes, appointed specialist—specialty materials and special products, General Electric Co., Schenectady, N. Y.

Arnold W. Asman, appointed product manager of mining equipment sales, Hewitt - Robins Inc., Stamford, Conn.

Edward V. Hegg, appointed manager of process equipment sales, Goslin - Birmingham Mfg. Co., Birmingham.

Fred H. Edgar, named sales manager, Detroit-Cleveland Div., Olin Aluminum, Detroit.

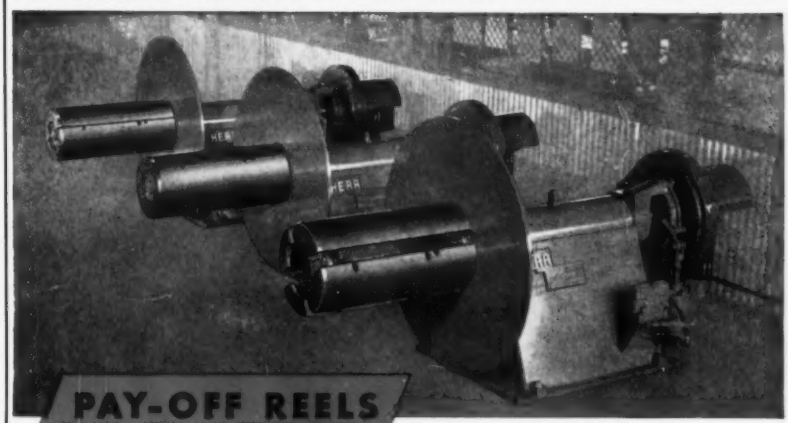
Robert Lindman, elected vice president and merchandising manager, Earle M. Jorgensen Co., Los Angeles, Calif.

Forrest F. Tiffany, named sales manager, Cincinnati-Dallas Div. for Olin aluminum, Olin Mathieson Chemical Corp.

Four representatives named to east coast sales offices of Allis-

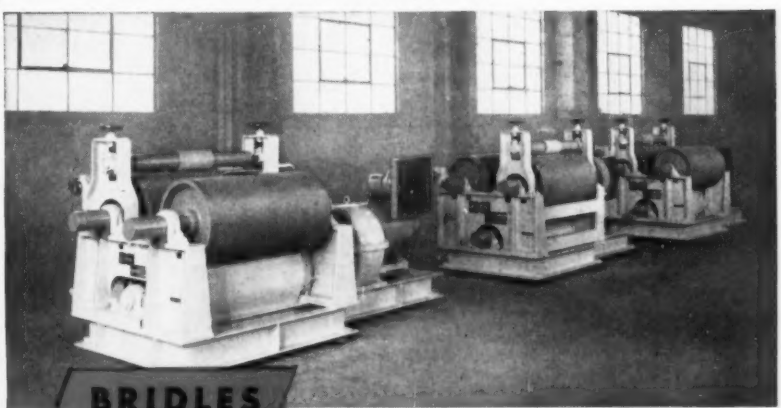
HERR EQUIPMENT

"Complete Processing and Handling Equipment . . . for any Ferrous or Non-Ferrous Material . . . That Starts — or Ends — as a Coil"



PAY-OFF REELS

Types and sizes for coils weighing from 5,000 to 50,000 lbs. and up to 84" wide. Fixed, adjustable or automatically aligning bases. Timken bearings. Can be equipped with threading drive, also automatic speed compensating drive for feeding presses.



BRIDLES

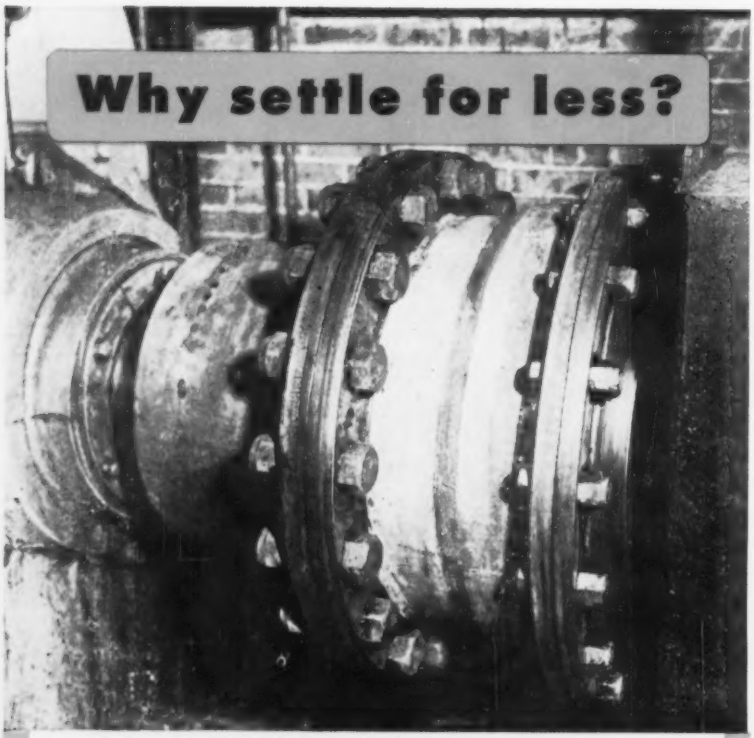
Types and sizes to meet any requirement. Plain steel, rubber covered or "Lorig" type self-aligning rolls. Air operated or regenerative brakes. Also four roll type that permits pay-off and coiling reels to be placed at the same end of the line and controlled with a single operator.

Write for fully descriptive Bulletin No. 561 today!

THE HERR EQUIPMENT CORPORATION

1260 VINE STREET • WARREN, OHIO

CLEVELAND, INDIANAPOLIS AND BERKELEY, CALIFORNIA



12" Waldron flexible coupling on a drive for a 12" bar mill.

by specifying

WALDRON

Gear Couplings

you get

STRENGTH —Hubs and cover sleeves for sizes 1¼ A through 7A are machined from tough steel forgings. Hubs are keyed to the shafts. The two one-piece cover sleeves function as a single, rigid unit serving as a floating connecting link between the hubs. High strength of forgings makes possible a very compact coupling with low rotating inertia.

RELIABILITY —There are no flexible parts to bend or break and the coupling is dust, moisture, and oil tight. Patented Walflex seal is positioned where centrifugal force is least. Clearance between teeth in hubs and sleeve is engineered so that an oil wedge always separates them, taking the wear.

SERVICE —Plenty of rough bore couplings, already assembled—on the shelf for *immediate* delivery. Finish bored standard couplings shipped to meet customers' schedules. We are geared up to give you realistic delivery on *any* type of couplings.

▶ Ask for Catalog 57

JOHN **WALDRON** CORP.

NEW BRUNSWICK, NEW JERSEY

Representatives In Principal Cities

Chalmers Mfg. Co. are: **Peter Brousal,** New York; **James W. Geise,** Newark; **Robert E. Russell,** Atlanta; and **Albert G. Wetzel, Jr.,** Philadelphia.

Walter A. Hebeler, appointed director, export sales, Tractor Group, Allis-Chalmers Manufacturing Co., Milwaukee.

W. John Porter, Jr., assigned to the New York district sales office of Baldwin-Lima-Hamilton Corp.

Vinko Dolson, appointed factory manager, **Gus S. Green** named development manager, of Fort Worth, Tex., plant, Convair Div., General Dynamics Corp.

A. J. Zauher, appointed chief engineer, U. S. Steel Homes Div., U. S. Steel Corp.

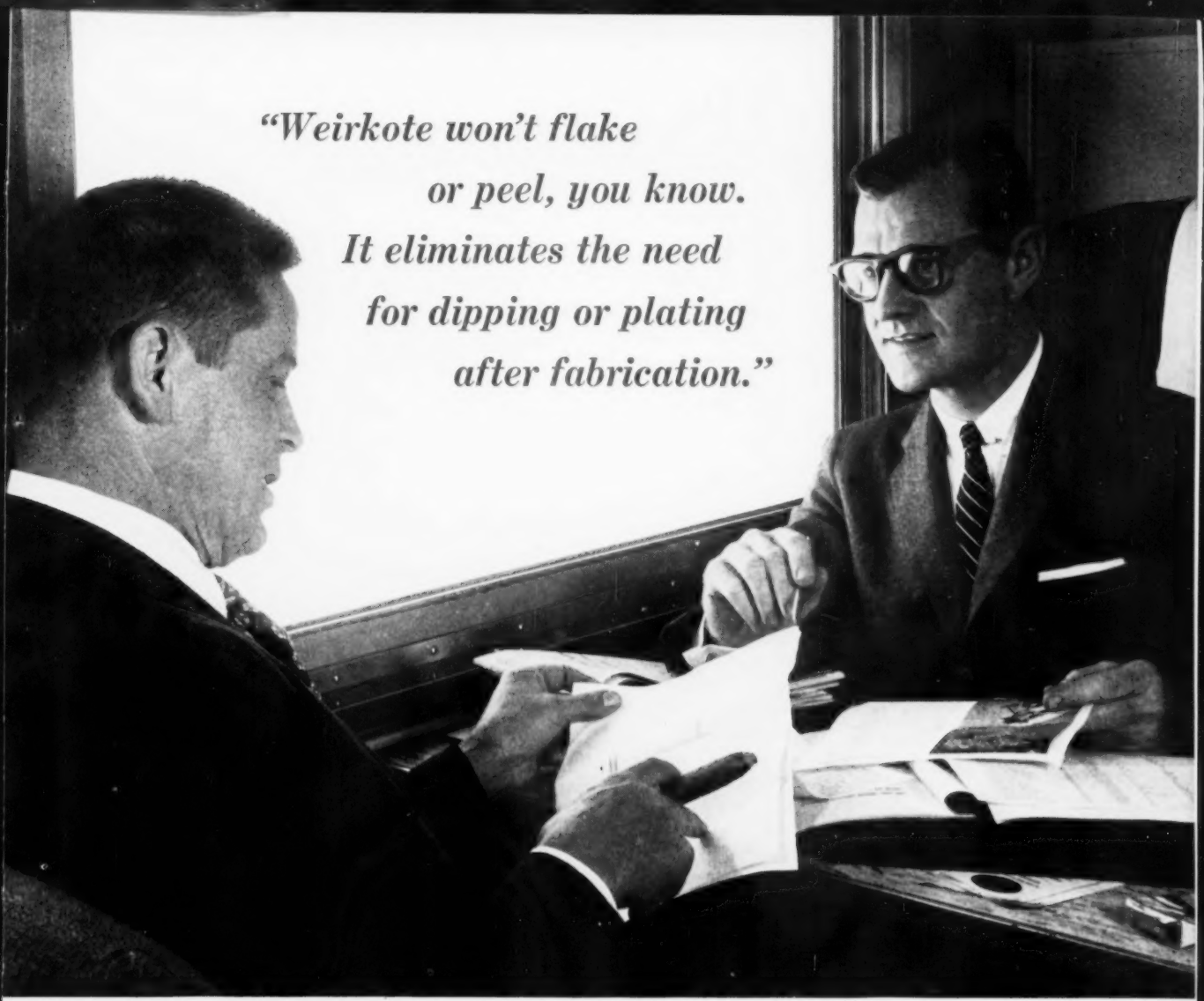
Merle W. McLaughlin, appointed vice president in charge of manufacturing, Copeland Refrigeration Corp., Sidney, Ohio.

John M. Huget, appointed assistant treasurer, Bellevue Industrial Furnace Co., Detroit.

Willard D. Clark, named district sales representative, New England, Pfaudler Co., Rochester, N. Y.

Emerson L. Claussen, elected vice president in charge of standard products sales, Standard Screw Co., Chicago.

Russell F. Sanders, named director, engineering and sales, Rochester Products Div., General Motors, Rochester, N. Y.



Q.—Weirkote . . . name's familiar. A zinc-coated steel, isn't it?

A.—*Yes, but with a whale of a difference. Weirkote is made by the continuous galvanizing process. Not the old pot-dip way. Its zinc coating is* bonded *skin-tight for keeps. And what an advantage that is!*

Q.—We're using an uncoated steel now, and dipping after fabrication. Even then we have trouble getting a 100 percent coating on some of our more complicated parts. Can Weirkote help us?

A.—*You bet—Weirkote's zinc coating stands up under the worst fabrication beating you'll want to give it. Shoot the works—stamping, punching, deep drawing, bending, twisting. Weirkote stays put. Stays uniform. Just won't flake or peel.*

Q.—Sounds like Weirkote may be the answer to a lot of our problems.

A.—*Try Weirkote, by all means. You'll never regret it. Weirkote is one of the shortcuts to economy* and *quality in your business and ours.*

Send today for free booklet that details the time- and cost-saving advantages of using skin-tight zinc-coated Weirkote. Write Weirton Steel Company, Dept. A-2, Weirton, West Virginia.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA
a division of
NATIONAL STEEL CORPORATION

SIR WILLIAM SIEMENS *brought many inventions to the steel industry but none with a greater future than the electric furnace. Knowledge of the carbon arc dated back to 1800. Siemens put it to practical use in 1878, when he built and operated steel-making furnaces on both the direct and indirect arc principles.*

Even then, electric power was too costly, and carbon electrodes of too poor quality, for an electric furnace to operate commercially. It was another 11 years before a successful commercial direct-arc furnace began operating, in France. America's earliest commercial electric furnace (at Holcomb Steel Company, Syracuse, New York) produced its first heat April 5, 1905. It was of 4-tons capacity. Today there are 200-ton electric furnaces and total domestic capacity exceeds 11 million net tons.

Great Names in Steel Making #V

The growth of the steel industry has been so fabulous that it confers ever-increasing greatness on the work of its pioneers. What William Siemens originated, the industry has since developed to an importance beyond anything he ever dreamed.

This is equally true of more recent technological discoveries.

The lubricant Palmoshield, for example, was developed after World War II to replace imported palm oil for rolling tin plate. It was immediately recognized as an important discovery. But, since then, the importance of Palmoshield has been greatly increased by its successful use for the rolling of light and intermediate gauge sheet, and on long terne and coating lines as well.

Most of the rolling mills of North America are today aware that Palmoshield does much more than protect from dangerous dependence on palm oil from overseas. They appreciate that it eliminates the former need for stockpiling and all concern with artificially influenced prices and supply. They value the fact that Palmoshield is produced in the heart of the steel country, from available domestic materials, and under exact chemical control. Fatty acid content can be controlled within ½%.

Moreover, Ironside engineers can and do formulate Palmoshield to suit the mill speed, the method of application and the individual preferences of each user, and guarantee that the compound so developed will not vary in uniformity thereafter.

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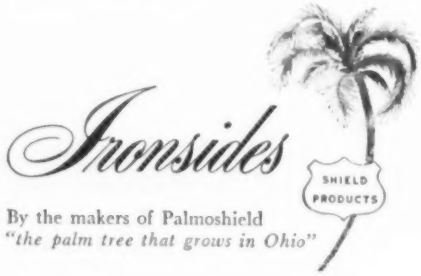

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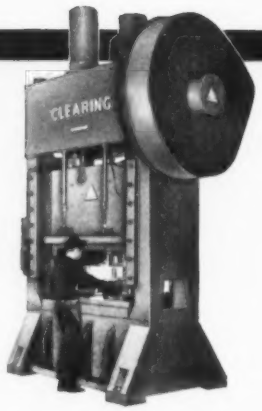

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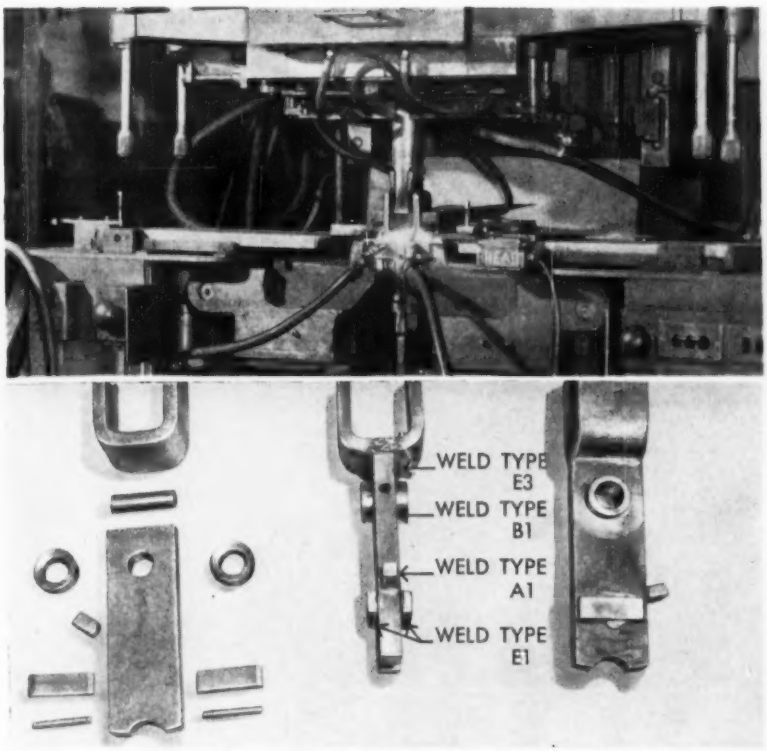
Eight Basic Resistance Welds Cut Costs on Short Runs

By E. J. Egan, Jr.—Machinery Editor

Juggling inventories for short run assemblies isn't easy. Especially when rush orders catch you with your parts-supply down.

Maybe you can redesign these items so they can be made from standard sheet and bar stock.

If so, then try fastening them with simple resistance welding methods, as this firm did.



IT'S ALL OVER: Welder (top) has just finished resistance welding the yoke assembly shown in detail below. Universal fixturing table and simple die mounting give this assembly a speed edge over other methods.

▪ Resistance welding with materials that are readily available might be the answer to one of your toughest production problems: how to manufacture a great many different, short-run assemblies faster, more simply and at less cost.

Consider the example set by Massey-Harris-Ferguson, Ltd. of Toronto, Ont., a leading producer of farming implements. Like other firms in its field, the company has one main task: short-run production of a multitude of different assemblies.

The Old Way—Before it adopted resistance welding on a broad scale, the company used numerous steel forgings and castings in its equipment sub-assemblies. Necessary joining of these components was done either by fusion or arc welding.

To satisfy minimum production control standards and yet hold manufacturing costs within reason, the firm maintained an inventory of the castings and forgings used most often. Those parts not commonly used were somehow "worried through" whenever they were needed.

On this basis, storage and inventory control was a complex problem. In addition, runaway fabricating costs and serious quality control problems accompanied each rush to fill an unexpected production order.

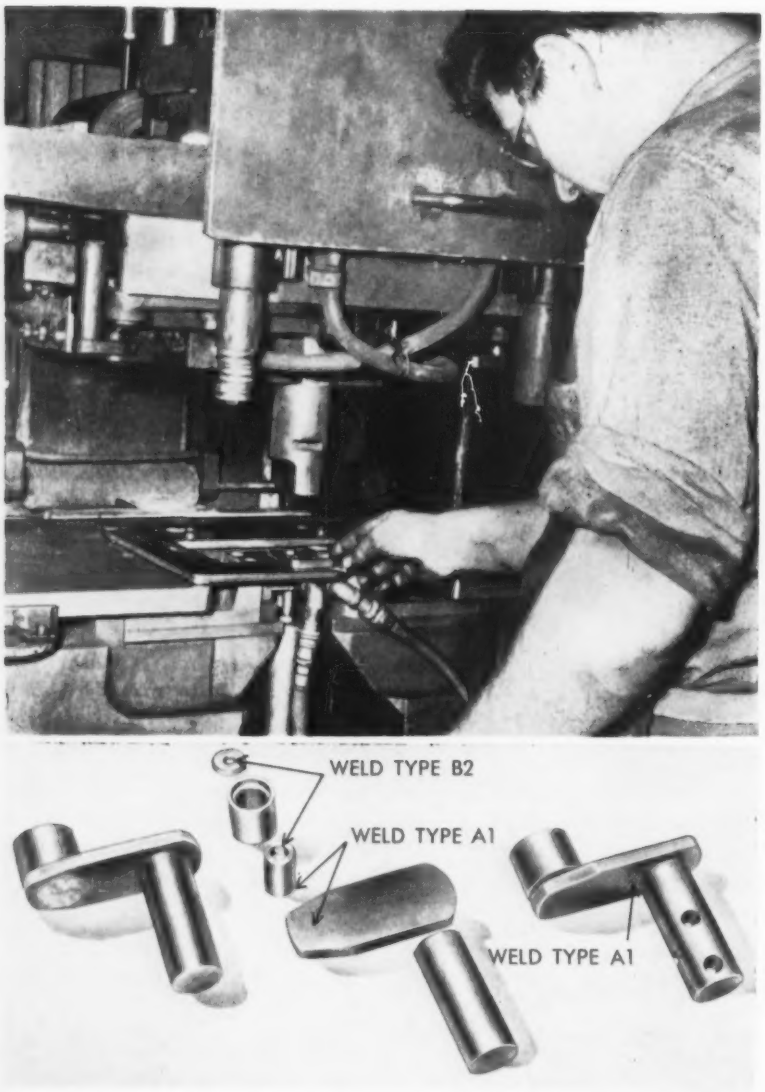
Ray of Hope—Eventually the cost research department took a long look at the overall situation. Logical reasoning indicated a possible solution to the many vexing short-run production headaches:

adoption of an altogether different assembly-fabricating technique for general use.

But—any such new technique would have to meet several important requirements. It would have to be both positively dependable and thoroughly consistent in producing low-cost, top-quality results. And it would have to use simplified tooling and fixturing to keep setup time at a minimum in switching from one assembly job to another.

First came the idea, then the conviction that proper resistance welding methods could satisfy all of these requirements.

Try New Designs—This led to an exhaustive study of all assemblies used in the full line of farm implements. Wherever possible, those that made use of castings and forgings were redesigned to eliminate them. Instead, each new design called for resistance welded combinations to make use of standard sheet, tube and bar stock, together with screw machine products.



QUICK SETUP: A fast tooling change and production of baler pickup cranks is underway. Detail photo shows (l. to r.) old fusion welded part requiring plug welding and grinding, present parts, and present assembly. One welding stroke now contains the rolling bearing.

As the redesign project advanced, it became clear that eight basic types of resistance welds would take care of all the fastening details in the revamped assemblies.

To verify this, extensive test-weld programs were conducted on actual implement parts—structural as well as non-structural. Success of these tests and of the pilot production program indicated the next step: to design a general purpose welder that would produce any or all of the basic types of welds as needed on the various assemblies.

Consultant for this phase of the program—and eventual supplier of the resistance welders now in use—was the Chicago firm of Sciaky Bros. Inc.

Tooling Built In—Each of the new welding machines has the necessary basic tooling and fixturing built in. Only the simplest forms of extra tooling are needed for any particular job, and the cost seldom exceeds $75.

Setup time to weld any assembly now averages a scant 30 minutes. Determining the machine settings for correct current, time and pressure merely requires the set-up man to glance at a printed chart.

Massey - Harris - Ferguson finds that the cost of a resistance welded assembly averages from 10 to 40 pct less than similar parts which were formerly arc welded. The saving in time of the welding operation itself averages from 60 to 90 pct and the sheet, bar and screw machine products now used also cost less than many of the former castings and forgings: savings of over a dollar per unit are not unusual.

The new resistance welding technique brings other advantages as well. For example, it performs more operations faster, with results that are consistently high in quality. And it adds the economy of producing finished assemblies with fewer workers. Moreover, these workers need not be highly skilled.

Accompanying photos show some of these short-run parts, and indicate what the firm has achieved in terms of product strength, simplicity and economy.

Massey-Harris-Ferguson Designates Its Basic Resistance Welds For Steel Parts According To This Code

TYPE A—
Rounds on End Welded to Flat Faces
- A1—Plain shaft
- A2—Plain shaft with washer
- 1A—Rect. bar narrower than shaft
- 1B—Rect. bar end smaller than shaft

TYPE B—
Ring Projection Welds
- B1—30° taper ring end to flat plate on flat

TYPE C—
Round on Side Welded to Flat Plate
- C1—Solid round bars to flat
- C2—Round tube to flat
- C3—Round edge bar to flat plate
- C4—Round to rectangular bar on edge

TYPE D—
Round Welded to Flat on End (Coped)

TYPE E—
Filler type Welds

TYPE F—
Spot Welds

TYPE G—
Die Formed Projection Welds
- G1—Round - domed projections
- G2—Sheared projections
- G3—Single sheared projection

TYPE H—
Rounds Welded to Rounds
- H1—Rounds in line
- H2—Rounds at right angles

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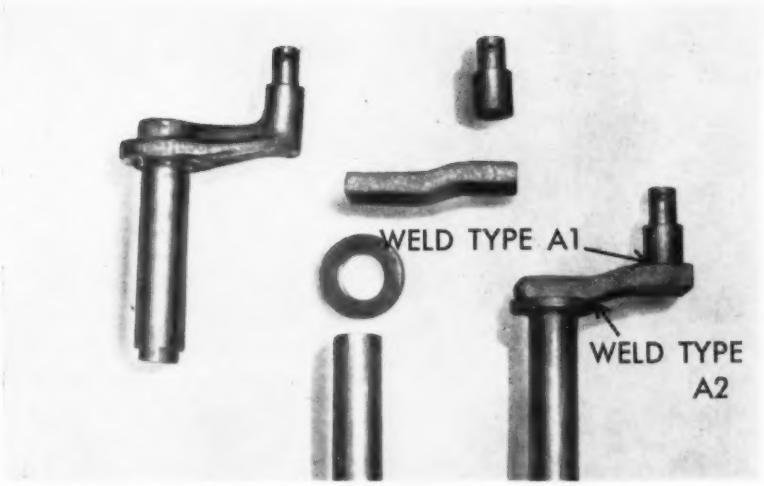
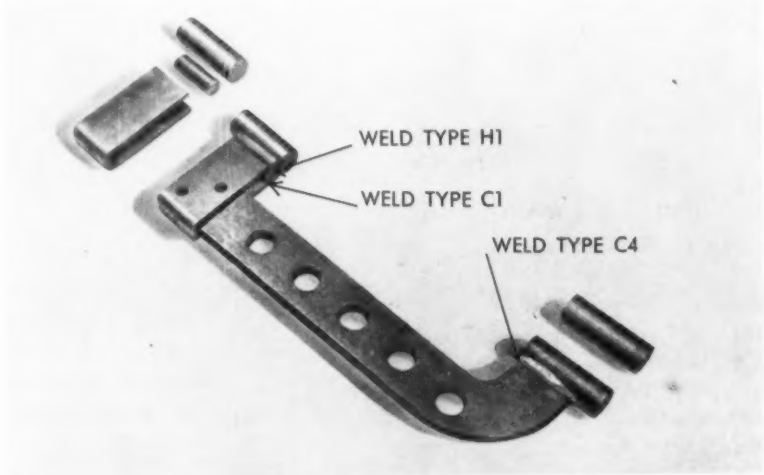
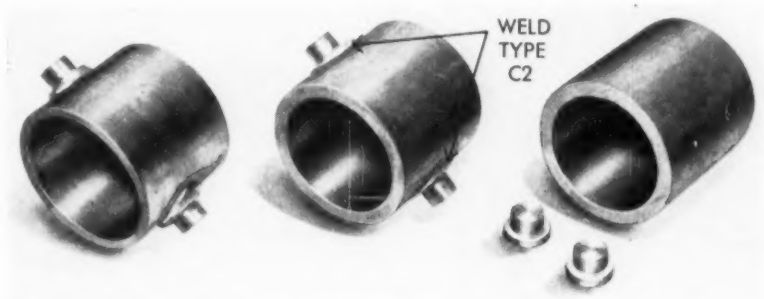


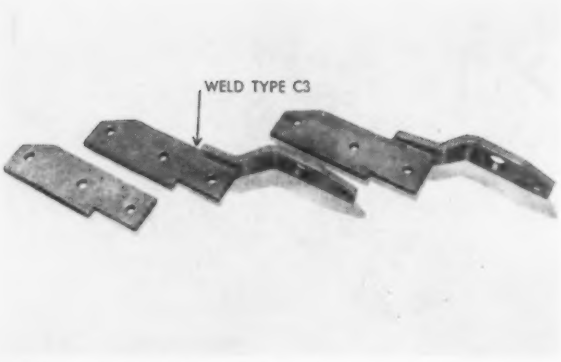
BELL CRANK: Old method (left) required pressing a screw machined plug into the malleable casting's socket, also used a cored, hollow milled casting for the long shaft. New resistance welded form uses a piece of hot-formed stock, a washer and two screw machined parts.



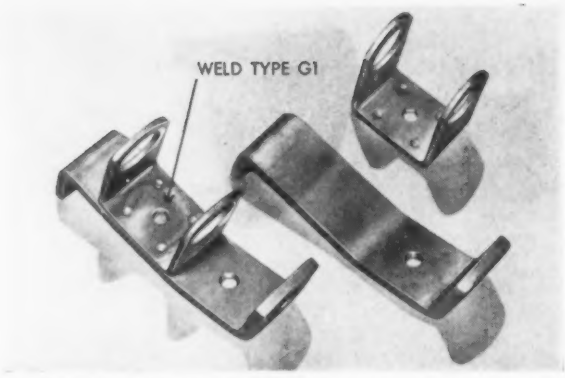
DRAW BAR AND KEEPER: Formerly arc welded, this primary strength member is now fabricated by resistance welding standard round and flat stock. Rugged new assembly is more economical to make than the old one. Thickness of keeper is ¼ in., drawbar is ⅝ in.



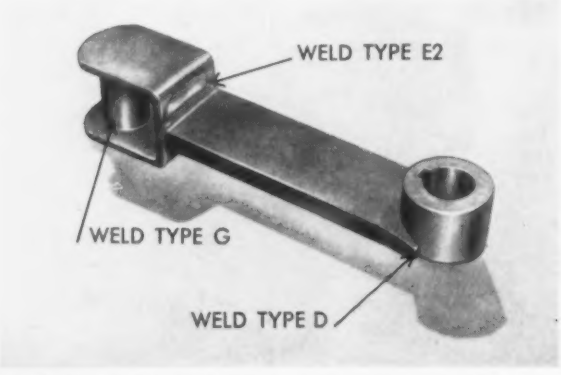
FORMERLY CAST: Bearings are now made with the type C2 resistance weld which joins a round tube to a flat (bar end). New method maintains tube ID. Tube at left has a wall thickness of 0.208 in.; one in center is 0.250 in. Parts prior to welding are at right.



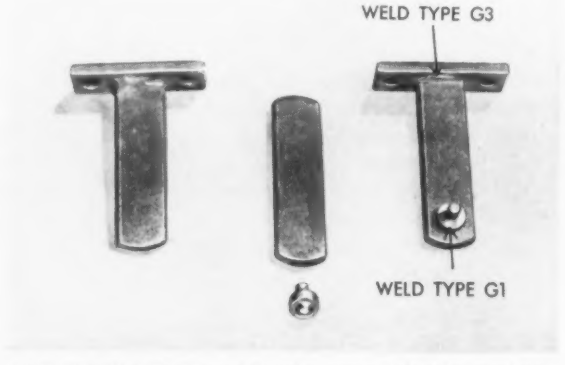
HANGER FOR DISKS: A saving over arc welding is gained by using the type C3 resistance weld to join a round-edge bar to a flat section. Round edge of bar is set down sufficiently to get a strength factor greater than 100 pct. Old form is at right, new one at left.



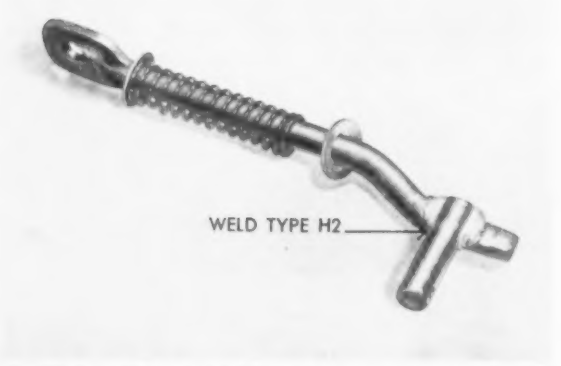
ANOTHER SAVING: Steering axle guide bracket is resistance welded according to the basic G1 weld design which joins formed round projections in flat material to another flat surface. Here four projection welds of proportionate strength are made in one stroke.



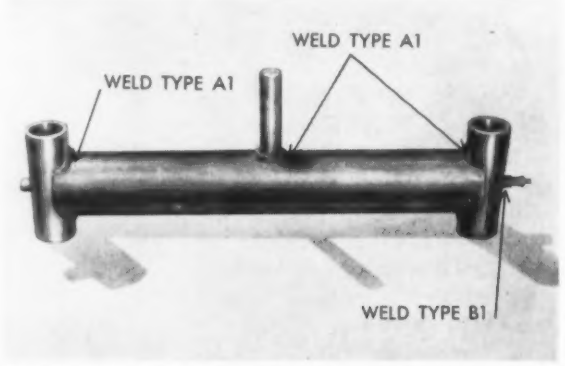
SHAKER ARM: Three types of resistance welds bring substantial savings compared with former arc-welded assembly. Present method insures conformity to specified dimensions and also makes it easier to interchange these shaker arms in farm implements.



OLD VS. NEW: The old-style, arc welded form of this assembly is at the left. Two G-type resistance welds now produce the new, more economical version (right). With the present technique, no difficulty is encountered with warpage and distortion of weld areas.



FUSION NOW TABOO: This latch assembly is now produced with a type H2 resistance weld which joins the two round sections at a right angle. A heavy set-down at the weld area creates a high strength bond. Present technique costs less than fusion welding.



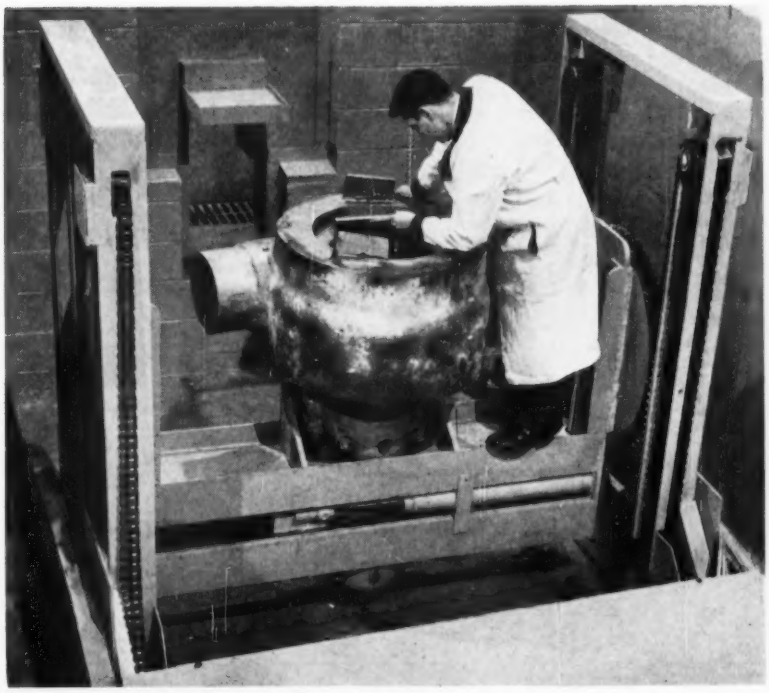
SIMPLE REDESIGN: By adapting resistance welding, this tiller assembly can now be made at less expense than by forging or casting. All critical dimensions, as well as concentricity, are held without difficulty. Set-down on tube ends is done easily.

Where Betatron Inspection Fits In Metalworking

Betatrons cost big money. But they can inspect thick metal sections reliably and quickly.

To get the most from a betatron, watch your inspection setup and its layout.

Efficiently designed, an inspection chamber permits using the machine more than 50 pct of working hours.



TURNS 360°; Hydraulically-controlled positioner, turns, tilts, moves transversely. High-energy electrons stream from betatron through aperture in background. Worker is installing cassetted X-ray film.

■ You'll not find betatrons in the average shop. Not today, at any rate. Their high cost partly explains this. Unfamiliarity with what betatrons can do is a factor too.

By knowing how betatrons aid the inspection job, you can judge better whether such equipment is for you. Circumstances exist where no other equipment will do the job as well, accurately, reliably, or as fast.

Take quality control of castings, for example. Radiography can tell the inspector a lot. Bonney-Floyd Co., Columbus, has found this so.

The founder uses its betatron in many ways.

First, for radiographic inspection of castings with sections 3 in. thick and over.

How Used—Second, to maintain and improve quality standards on noncritical castings. Radiographs are made when the founder thinks they are needed. This even when X-raying is not a customer specification.

Third, to spot check identical castings. Differences between such castings become visible. Ways of improving standards can then be devised.

Fourth, the betatron is used as a design tool. It helps in working out better casting techniques. Even when well established casting procedures give good results, it's possible to improve methods by radiographing cast parts.

Fifth, betatron inspection has permitted getting more castings per melt. It also has made possible larger castings with existing melt facilities.

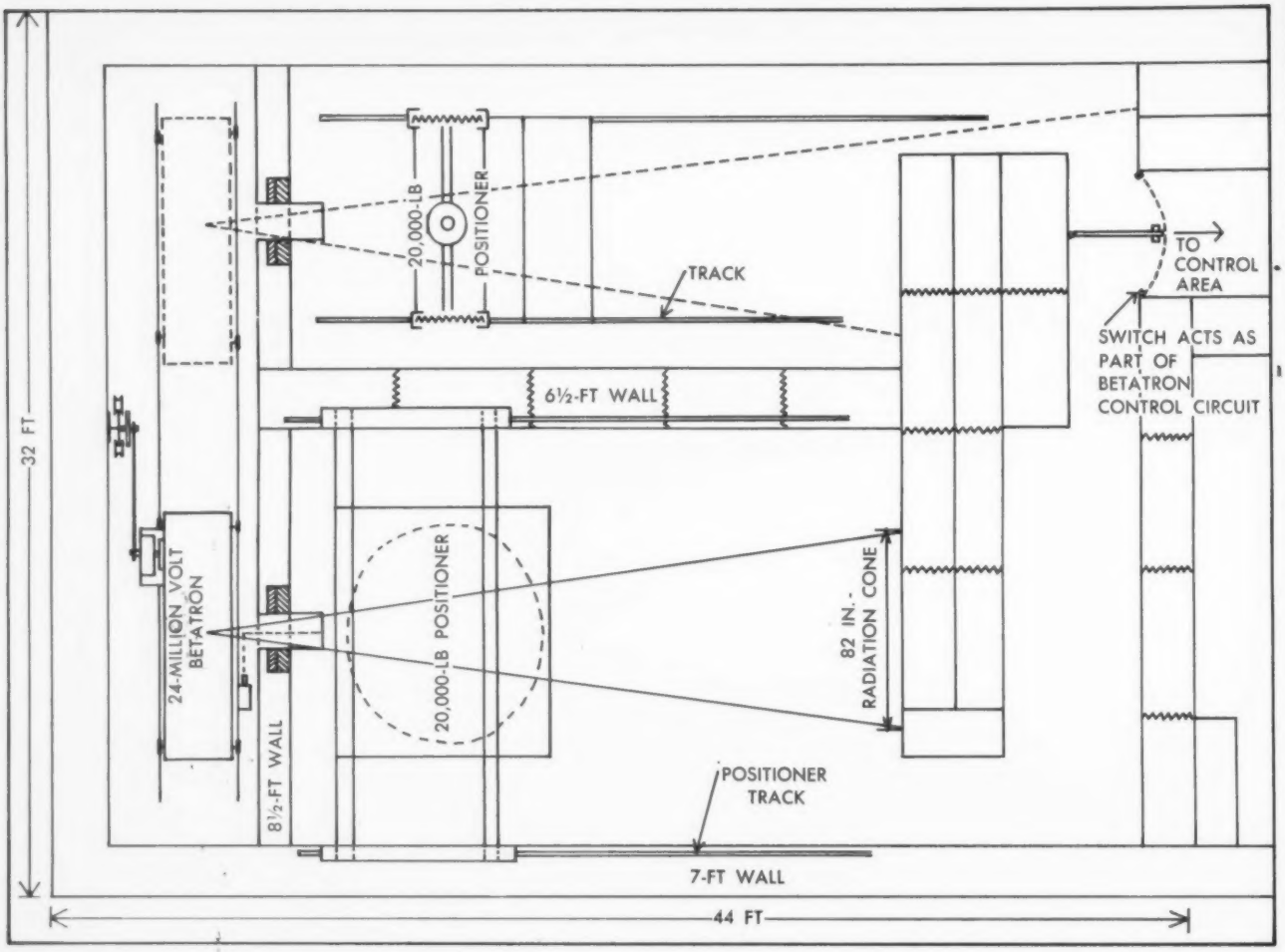
Higher Output—This last comes about through radiographic inspection of risers and feeder heads of castings. Amount and direction of shrinkage in the head is found. As a result, some heads have been reduced in size. Reduction of head size increases yield per gross weight.

Bonney-Floyd Co., a 50-year old founder, pours around 1000 tons of steel castings per month. Production ranges from standard steel castings to castings for nuclear reactors and power plants. Composition of cast parts varies from plain carbon steel to the austenitic stainless types.

Inspection requirements of the Navy's Atomic Power Program state that radiography must be reliable and accurate. $Cobalt_{60}$ will do such a testing job. Bonney-Floyd inspects with radioisotopes too.

Too Slow—But on metal sections over 3 in. thick, exposure time with $Cobalt_{60}$ can be too long. The volume of work calling for X-raying warrants a faster method of inspection.

A 24-million v betatron offered



the best means to maintain and improve quality standards on both government and civilian casting jobs with heavy sections.

Industrial betatrons available for use are found only at government-financed facilities, or ordnance installations. To these add the facilities of the betatron maker. Allis-Chalmers Corp., Milwaukee, to name one, builds such equipment.

Shipping castings to other betatron setups for radiography is possible. But it involves shipping expense and impairs production. So Bonney-Floyd started thinking of complete radiography facilities of its own.

Installation—Betatrons normally require elaborate laboratory construction. Bonney-Floyd wanted to avoid this. But successfully fitting a complete betatron setup into an existing structure called for ingenuity.

A steel-frame building constructed in 1956 was selected. It has sheet metal siding. Shredded sugar cane fiber cemented into fire-resistant slabs insulates the metal roof on the inside. The building is next to the foundry finishing room.

Originally, the radiography section consisted of three rooms for Cobalt $_{60}$ inspection work.

Notched Blocks—Separately-cast blocks of fine-grained dense concrete were used. They are interchangeable, and readily rearranged by a 7½-ton, floor-operated crane. Construction in this manner made possible nearly continuous cobalt inspection while installing the betatron.

A block building near the control center for the betatron houses all auxiliary test apparatus. Equipment here includes (1) a universal testing machine, (2) an impact tester, (3) a mass spectrometer and (4) a hydrostatic testing rig.

Layout Puzzle — Considerable thought went into the layout of the betatron laboratory. The rooms must be large enough to position castings. In addition, they must shield the rest of the building from radiation.

Radiographic work in two separate rooms proved the answer. The betatron shuttles back and forth between the two rooms on a track. In this way, workers position a casting in one room while radiography progresses in the second.

Fig. 1 shows the final layout. The floor plan made possible better shielding, allowed good accessibility to the floor crane, and gave the rooms the desired length.

Efficient use of floor space demanded that positioners be used to hold castings in place for X-raying.

FIG. 1: Betatron laboratory layout shows two inspection chambers. Serrated edges of concrete shielding blocks permits easy rearrangement of chambers to accommodate oversize parts.

Note entrance (upper right): automatic cutout switch makes betatron operation impossible unless door is closed. While workers adjust casting on 20,000-lb positioner in one inspection chamber, X-raying proceeds in the other. A 7½-ton crane moves parts.

Positioners move on tracks. This permits X-raying sections up to 82 in. wide.

Expansion in the future is anticipated. Betatron machine swivels on a turntable. Building two more chambers abutting the betatron track will double inspection capacity of the setup.

It's easier to move a casting within a core of radiation, than to move the betatron itself.

Tilts And Turns—Mounted on tracks atop the shielding walls, the first positioner can traverse the length of its room. Sidewise and tilting movement also is possible. The entire table (and the casting mounted on it) can revolve 360°.

The second positioner mounts on a floor track. Components clamped to the table face can be revolved. This eases the job of "scanning" the part. It also makes shots of the underside practical. Hydraulic motors drive chains which turn sprockets supporting the casting.

Positive positioning of the betatron in both chambers is essential. Otherwise, the cone of radiation would not strike its target precisely. The shuttle device moving the equipment from one chamber to the other controls this.

Shuttle Setup—The shaft of a motor and gear reducer connects directly to a positioning arm. As this shaft turns, it lifts the positioning arm. Motion of the arm forces a wheel assembly to travel up a guide beam standing upright at the rear center of the laboratory between the two testing chambers.

The wheel assembly becomes the fulcrum of the positioning lever. So the positioning arm pivots, dragging the truck-mounted betatron with it.

Midway between the two rooms, the wheel assembly starts to descent. In doing so, it pushes the betatron on its truck into the second chamber. Positive positioning is assured by the length of the arm, and a limit switch.

Full Schedule — Bonney-Floyd now works the betatron on two 10-hour shifts, six days a week, plus a single shift on Sunday. Two laboratory technicians comprise each shift. A radiography supervisor increases the day shift to three workers.

Developing film takes a female photo technician 8 hours daily. In the 20-hour day, she processes 140 betatron films (70 double-film shots). The same technician also develops cobalt film.

Results of operation are somewhat startling. A casting which required 60 hours handling and radiography on other betatron setups is processed at Bonney-Floyd in 30 hours. The firm credits room layout, use of positioners and other shortcuts with this improved efficiency. With even better operating techniques on the way, radiography and handling time for this particular casting should be cut to 20 hours or less.

Utilization of the betatron runs high. During operating hours, it comes close to 50 pct. Previously, 30 pct use was called high on this type operation.

BETATRON SHUTTLES: Lever arm (right) is actuated by motor (rear), causes wheel assembly (right foreground) to travel up guide rail. This first pulls, then pushes betatron to opposite chamber.

Paint Parts First, Machine Later

By A. A. Janis—Chief chemist, Instrument Div., American Optical Co., Southbridge, Mass.

Epoxy resin finishes strongly resist many chemicals. Such inertness has strong appeal.

But their resistance to impact and abrasion holds even broader significance.

Production tests prove you can paint with an epoxy first. Then later you stamp, form or finish machine with no coating damage.

▪ Human perspiration can be a production problem. Few synthetic or natural resin finishes on metals successfully endure it for long. But epoxy resin based paints stand up.

Initially, that's why American Optical Co. went to a one-coat epoxy finish over primed parts.

Production engineers at the firm then set to work. They noted epoxy's claim of superior resistance to impact, abrasion and other cracking and peeling forces. These claims they took to heart.

Now parts are primed and finish-painted first. Machining to size, reaming and threading come later.

No Peeling — Chuck pressure doesn't scratch or mar the finish. The epoxy film adjacent to cut surfaces continues to adhere firmly to the base metal.

One pass with hot spray equipment builds up specified film thickness. This without runs, sags or fatty edges. Formerly used coatings required two or more passes for the same film thickness.

Unconventional though this painting practice is, the end product stands up well. American Optical has yet to receive its first customer complaint of an epoxy coating failure.

Elastic Film — Flexibility and adherence of the epoxy film account largely for such results. Remember this resin also finds increasing use as an adhesive, when formulated as such. (See The IRON AGE, January 21, 1957, p. 94.) It's the same plastic used as a base material in some short run stamping and forming dies.

American Optical makes a large line of instruments. Ophthalmoscopes used by physicians are perhaps typical. None is mass produced.

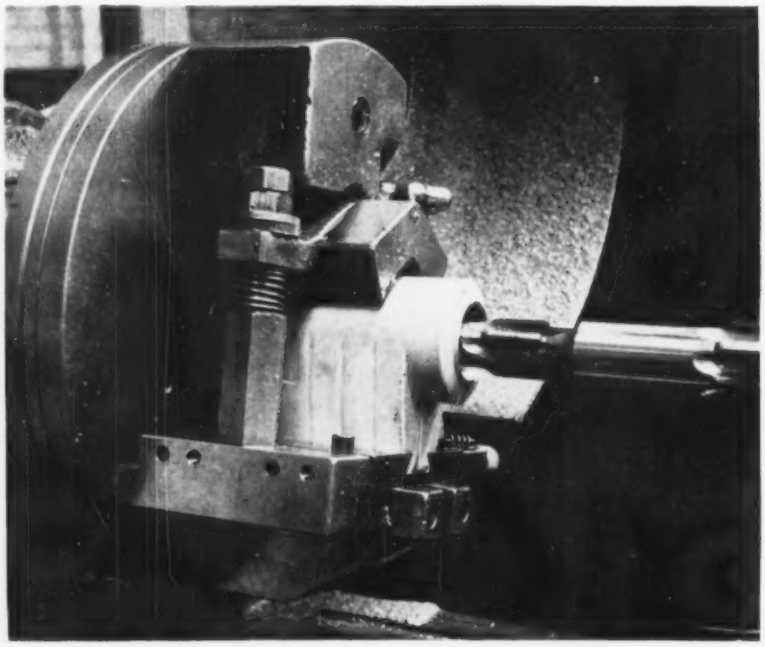
Individual parts are hand sprayed. Automatic coating equipment simply isn't practical for the short production runs of widely differing designs.

Alkyd-urea coatings and lacquers were used earlier. They performed well in most cases. But they fail in some corrosive solutions, perspiration included.

Enter Epoxy — To improve the finish, epoxy resins were considered. Shell Chemical Corp., New York, supplied a batch of its Epon epoxy resin. Formulations suggested by Shell Chemical underwent test at American Optical.

Applied by hot spray, the epoxy resin proved a success.

Resistance to abrasion is improved. Tested on a Taber rotary abrading machine, a 1-mil thick, baked epoxy resin film averages



UNSCRATCHED: Casting prepainted with epoxy withstands chuck pressure without scratching, flaking or peeling. Epoxy film is flexible.

3000 cycles before coating breakdown. At times, it's endured more than 6500 cycles per mil. Alkyd-urea coatings used formerly abrade through to the base in about 1500 cycles per mil thickness. All this under standard conditions: a CS 10 wheel and 1000 g load.

Immersion Test — Perspiration resistance went up, as tested with a standard synthetic formula (see Table I). Submerged 48 hours in this mixture, a 2-coat plus primer system of alkyd-urea resin deteriorates. After 96 hours, holes form. Deterioration is nil with the one-coat plus primer epoxy resin system after 96 hours test.

Chemical resistance is better. Baked parts may be wiped with one of a number of solvents during assembly and later. These include xylol, acetone, methyl ethyl ketone and naphtha. The coating withstands all these, and resists staining by greases as well.

Film thickness is uniform. This assures even substrate protection. Wet film thickness runs about 2 mils. After final cure, coating thickness averages 1 to 1.5 mils. This is sufficient for the service intended.

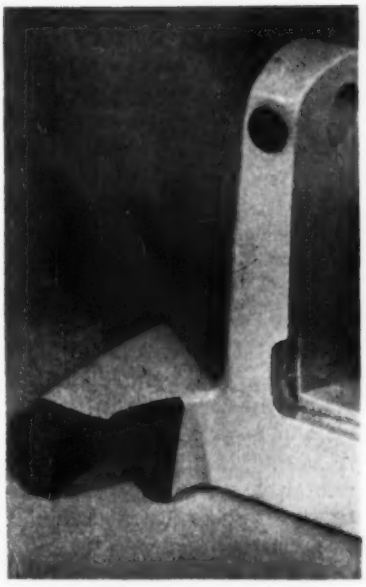
Finally, the epoxy finish has a beauty of its own. Few if any dust particles, surface blemishes or scratches show on properly applied coatings.

Several colors are used. This enhances the product. Physicians and other professionals contacting the public consider this of some importance.

Early Step — Before spraying, parts undergo considerable preparation. Castings first are polished to a satin-smooth jewelry finish.

Polished parts pass through an alkaline bath. This removes dirt, grit and polishing compounds. Bonderizing follows, a 4-stage treatment. Substrates must be well prepared for good coating adhesion.

Hot-spray guns apply the prime coat at 150°F. Primed parts bake-cure at 300° ±8°F. Thermocouples control heat in the box-type electric oven. Desired physical properties and color depend largely on controlled curing cycles.



Components then go through inspection for coating uniformity. Spot-puttying follows if needed. After fine sanding comes a dry wipe to remove dust.

Epoxy resin-based finish coats also are hot sprayed. They bake at 350°F.

Note the primer bakes at lower heat than the finish coat. This amounts to slightly undercuring the prime coat for better bonding between it and the finish coat.

Earlier and present coating costs are hard to compare. Two factors are involved: (1) a switch from alkyd-urea to epoxy resin paints, and (2) hot spraying. Both went into use at the same time.

The epoxy coating costs more. But hot spraying results in lower over-all costs than before.

Thinner to paint ratio now is 1:6. Formerly, a 1:3 ratio was needed for good spraying, which meant painting in two passes.

Formulation batches received always are inspected for total solids content, viscosity and color match. Suppliers of the epoxy paint are Interchemical Corp., and Flood and Conklin Mfg., both of Newark, N. J.

Instruments now coated with epoxy resin-base paints include otoscopes, ophthalmoscopes, etinoscopes, screening perimeters and refracting chairs, plus other equipment found in the medical diagnostician's office.

The finish has proved itself so well in such service, that it is also being applied to stereoscopic microscopes. These instruments find industrial use in assembly and quality control departments, as well as in industrial laboratories.

LEFT: Epoxy film continues to adhere firmly to substrate after hammer fracturing. Note lack of ragged edges both at site of blow, and on the opposite side. Not one coating failure has been reported yet by instrument users.

BOTTOM—LEFT: As finish-machined, part shows continuous painted film with no ragged edges or flaking. Epoxy coating is applied in one pass with hot spray equipment to build up thickness required.

TABLE I

Synthetic Perspiration

Ingredient	Pct by weight
Sodium chloride	5
Acetic acid	5
Butyric acid	3
Iso-Valeric acid	3
Water	84

Double Heat Treatment Strengthens Cast Wheels

By **Larry DeBoer**—Metallurgist, Railroad Products Div., American Brake Shoe Co., Calera, Ala.

For years, forging's been the accepted way to produce railroad car wheels.

But recently, cast steel wheels have been gaining ground. They're piling up impressive records in freight-car service.

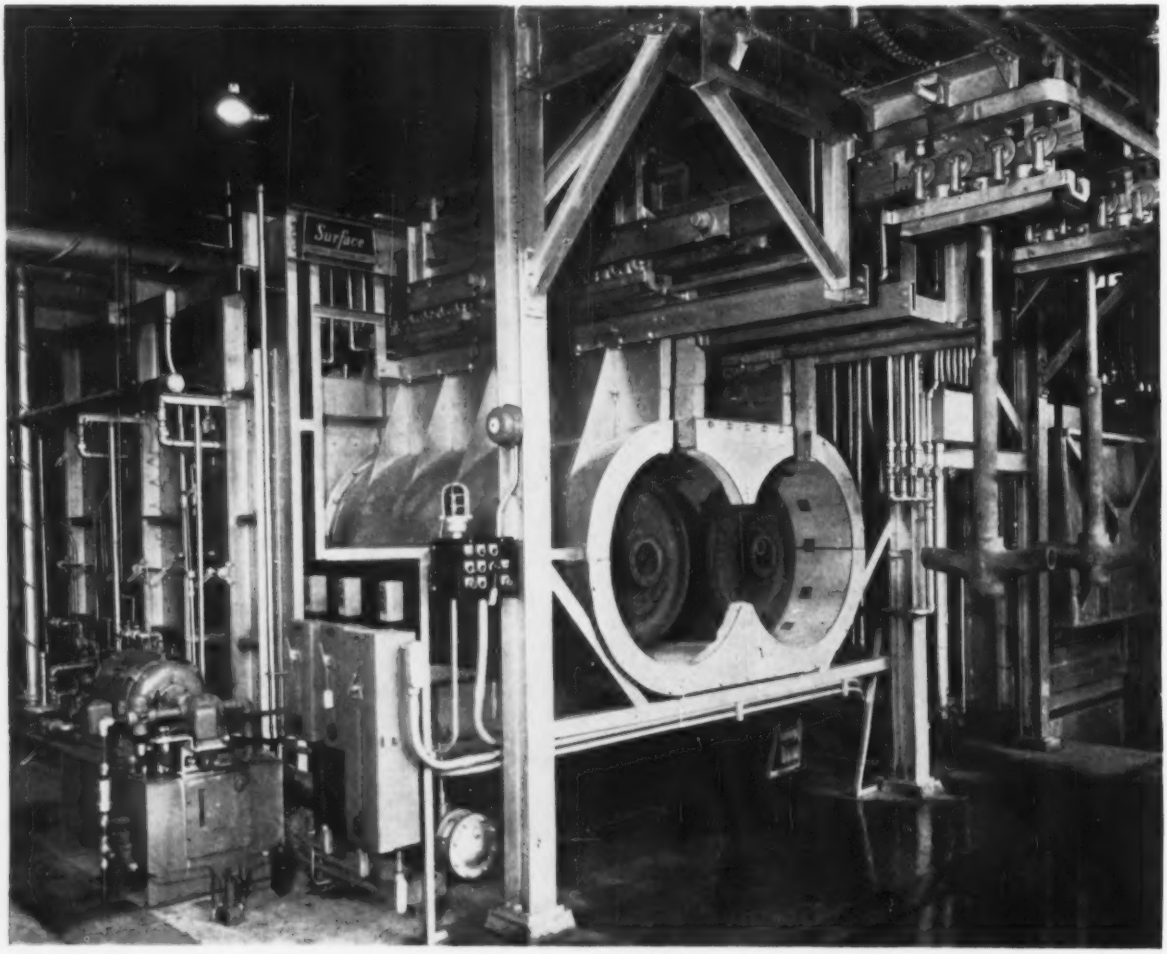
Careful heat-treatment helps produce the stronger cast wheels.

■ Tough and wear-resistant freight car wheels are being produced from 1.50 C cast steel at the Calera, Ala., plant of American Brake Shoe Co. A patented double-annealing treatment with a specific cooling time between furnaces gives them their excellent properties.

The Southern Wheel plant was built especially to produce the wheel. All production operations, annealing included, are on a definite time schedule so wheels are processed before cooling below 800°F.

One operator works the automatic, two-furnace setup.

Heat Treat Problem—The "as cast" wheels have little elongation due to their inherent structure. To improve this as cast structure, the carbides have to be dissolved into



EFFICIENT SETUP: Fixtured wheels make the circuit through diffusion, spheroidizing furnaces, emerge from furnace exit door near original wheel-loading point. Wheels then transfer to station and are removed.

the grains, then spheroidized to produce a structure that is tough and wear resistant, and which will make subsequent machining operations simpler.

But let's follow the wheels step by step from their origin at the pouring floor. Metal from electric melting furnaces is poured and allowed to solidify in wheel molds for 51 minutes. Then the combination pouring head and riser is lifted from the hub. After cooling for 64 minutes, the casting is separated from the cope and drag and gets sent on to the shake-out.

Thorough Cleaning — From shake-out, the wheels go through a cleaning cabinet where chain flails and sand blast remove adhering molding and core sand. A fixtured gas-air burning torch then burns out feeding gates in the hubs.

Wheels hold much of their heat right through these operations. Plate and tread are at about 1000°F. The thicker hub's around 1600° to 1800°F.

Next stop is insulated cooling pits. These bring wheels to a common temperature of around 1250°F in anywhere from 6 to 24 hours.

Overhead monorail cranes remove wheels from the pits, one at a time, and take them to a loading carriage near the furnace loading area. The carriage—holding four wheels at a time—is then positioned at the loading station. Pneumatic arms then pick up the wheels, turn them to a vertical position, and place them on inverted T-shaped fixtures. These have been brought to the same point by a cross-transfer mechanism.

Furnace Setup—The heat treating arrangement consists of two special Surface Combustion ovehead-conveyor-type continuous furnaces. Located side by side, these are interlocked by the overhead conveyors and overhead transfers at each end. Wheels travel through these furnaces (the first operates at 1750°F, the second at 1450°F) on the conveyorized, T-shaped fixtures.

The operator simply pushes the start button to begin the cycle.

Three pushes on the overhead trolley start the cycle. These place the set of two fixtures (four wheels) in the shaped vestibule of the 1750°F furnace. Furnace pushers are timed to advance the wheels so that—2½ hours after leaving the vestibule—wheels will be up to heat. They'll then travel through the holding zone, one against the other, at a rate that permits holding them at 1750°F for 2 hours.

Zoned Furnace — The high-heat or carbide diffusion furnace has 11 heating and holding positions. This arrangement permits 22 wheels in the row at all times. At the proper cycling time the high-heat exit door opens downward into a pit and the overhead mechanism pulls out a set of trolleys into the cooling station. The same mechanism moves the set of wheels already in the cooling station onto the cross transfer conveyor ready for the spheroidizing furnace.

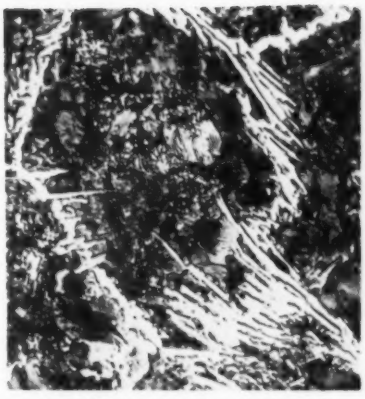
Plate and tread areas of wheels have by this time cooled to about 1000°F, but the hub is still at a temperature slightly above the critical. However, hubs cool below the critical before entering the spheroidizing furnace heating zone, where they reheat to 1450°F.

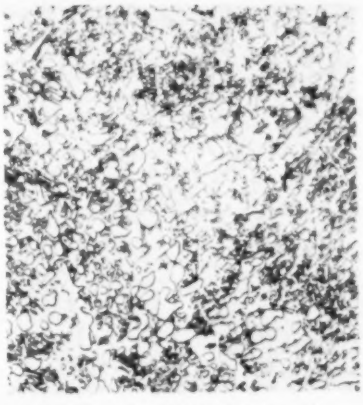
Wheels come up to this temperature in 4 hours, then remain in the holding zone for 5 hours. Fixtures are then removed automatically and are unloaded onto the carriages which first brought them.

Cooling Arrangement—Carriages then carry the wheels out of the furnace loading area and to an overhead crane. This lifts wheels in pairs onto a hub cooling conveyor. This horizontal roller conveyor spaces wheels for indexing under spray nozzles. Wheels are allowed to air-cool through transformation before spraying.

Spray cooling on the inside of the hub develops favorable stresses. Spray time is carefully controlled.

Shot blast cleaning is next. Then wheels are accurately machined in the hub, tread and flange, in one operation, on Bullard vertical turret lathes. Inspection and shipping or storage follows.





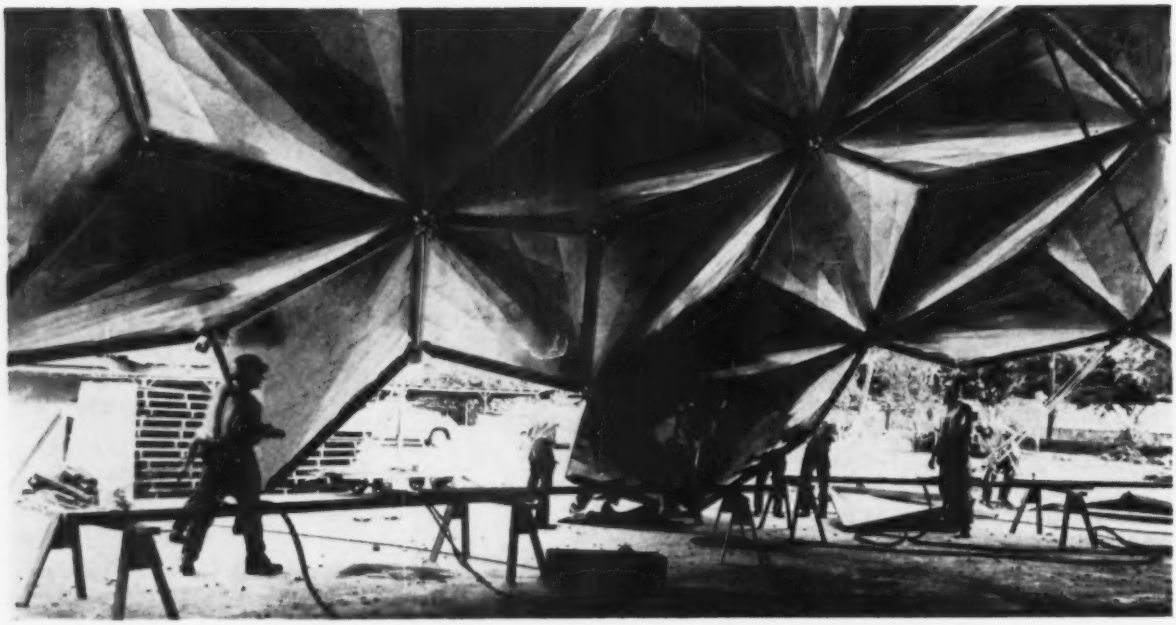
REFINED STRUCTURE: Photomicrographs show how double heat treatment changes as-cast structure to spheroidized structure at bottom.

Adaptable—The flexible furnace setup can be varied to operate on several cycles by making simple timing adjustments.

Conveyor mechanisms located in the arch of both the high temperature diffusing and the reheat or spheroidizing furnace are water and air-cooled. Monorails and trolleys are incased in a duct through which room-temperature air blows for cooling. Trolleys travel in pairs.

Operating on a thirty-minute pusher cycle, the high-heat furnace can heat 6250 lb of car wheels plus 425 lb of fixtures per hour from 1000° to 1750°F. This on a cycle of two hours heating and two hours holding. Temperature holds within ± 10°F.

The low-temperature furnace heats the same amount of steel, but operates on a four-hours-heating, five-hours-holding cycle. Heating is primarily with gas, using Hauck gas-oil burners.



RAISED IN STAGES: As sections are assembled, the 48-ft high dome-shaped structure was raised in increments of about 6 ft. This permits all fastening operations to be performed near ground level.

Hybrid Fastener Speeds Building Assembly

Building costs keep right on climbing. Materials come high enough. But it's the cost of hanging them together that hurts.

A new fastening method, promises to cut erection time drastically on certain jobs.

Here's how one job planned around it panned out.

CINCHING UP: Operator uses hydraulic tool to tighten fasteners. More than 19,000 were used.

▪ The Kaiser Geodesic Dome in Hawaii—aluminum outer shell of a new auditorium at Kaiser's Hawaiian Village resort—is a sizeable structure. Standing 48-ft high and 152-ft in diam, it is made up of 575 diamond - shaped, cambered aluminum panels varying in length from 9 to 11 ft. The completed auditorium will seat 1800 people—2500 with a proposed balcony.

Yet a hybrid fastening process permitted putting the dome up in a record 20 hours from the time assembly began. Best earlier estimates were that erection would take about 5 days.

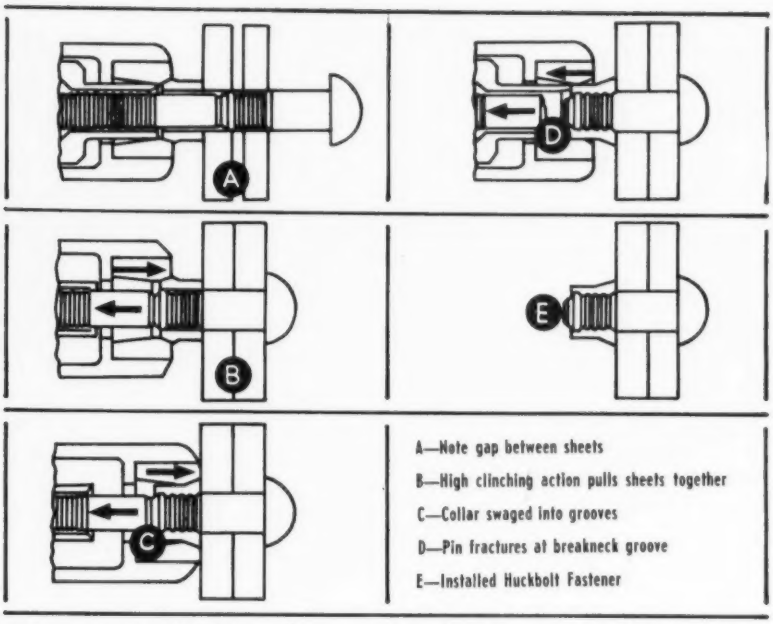
Recently Introduced—The fastener used is a rivet type with some bolt-like characteristics. Called the "Huckbolt" fastener, it's produced by the Huck Mfg. Co., Detroit, and was introduced only recently to the building and construction trades. Kaiser Aluminum and Chemical Sales, Inc., Oakland, Calif., selected the Huckbolt because of the unusual speed which they can be applied.

Actually, several factors figured in the fast erection time.

Foremost was the design of the dome itself. The aluminum panel construction permitted all assembly operations to be handled at ground level. Second—the fastening process is simple; workmen become skillful fast in using the Huck driving tool, which is light and causes minimum fatigue. Third, fastener design means there can be no improperly driven fasteners.

Finally, no fitup bolts are required for assembly.

Pilot Run—Kaiser developed the dome structure of geodesic design and tried a test erection at its Permanente, Calif., plant. This assembly check proved the design



HOW IT WORKS: These diagrams show the sequences involved in joining structures by means of the Huckbolt fastening principle.

satisfactory. At the same time, it proved the fastener's value. The panels had been designed and built with a series of holes in each flange for fastening the adjoining panels. But strength and rigidity values proved so good that the number of fasteners for flange-joining was cut nearly in half.

Pre-fabricated dome panels were then shipped to Honolulu. Two or three man teams working for Terminal Steel Co., the erection contractors, were then briefed (5 minutes was sufficient) in the use of the Huck bolt fasteners and the driving tools.

Brace bars or struts of aluminum were then attached to panels and braced panels were trucked for delivery to the job site on Waikiki.

Putting It Up—A portable, 96-ft-high construction mast went up first. Dome erection began with the joining of the first section of panels around this center mast. A pentagonal opening was left at the center. This so the structure could be raised in sections, permitting all fastening operations to be performed near ground level.

As each section was completed, eye bolts were inserted in holes provided in the gusset castings and were guy-wired to the mast's lifting mechanism. The section was then raised about 6 ft and the next circumferential section was assembled.

All panels were color-coded for quick orientation. Panels are arranged so that the diamond gussets meet in groups of three and in groups of six. Where three points join, a flexible three-piece casting is used; a rigid six-armed casting joins six gussets coming together. Special gusset castings at the bottom edge of the dome produce a finished appearance.

Fastener Use—Huckbolt fastener pins are dropped in from above. The locking collar then slips on from below and is driven with the proper hydraulically-powered portable tool (either 3/8 or 5/8 in. stroke). Three-man teams handled gusset assembly operations.

Flanges were joined on the underside. Two-man teams did the job, putting the fasteners in every other hole along each side of the diamond Locking plier clamps (the only clamps required in the entire assembly) held flanges together for fastening.

When the last section of the panelling had been joined, the dome was anchored to the concrete foundation with 25 aluminum struts. The 39,000-lb dome has a potential lift of 60,000 lb in a moderate breeze. So a major function of the anchoring is to hold the dome down. With anchoring completed, guy wires and eye-bolts were disengaged and the dome was allowed to settle.

Firm Structure—Actual settling amounted to only 3/4-in., rather than the 9 to 11 in. theoretically calculated for the 48-ft height of the building.

Steel tongues projecting from bottom panels help hold the dome in proper circumferential alignment, while allowing radial movement to accommodate for thermal expansion and contraction. The steel tongues ride in steel troughs, which are part of the concrete supporting pier. The dome may vary as much as 7 in. during the day in its 152-ft diam. The fasteners can go along without loss of strength.

With all fastening operations completed and the dome securely anchored, the portable construction mast was removed. A heavy aluminum foil disk was then cemented in place to seal gusset casting holes. Flange joints were caulked with the same sealer material.

Tight Fit—Sealing of the exposed fastener pin heads was not required. The driven fastener forms a leakproof joint at its point of contact with the aluminum-panel surfaces. And larger size Huckbolt fasteners are "hole-fill" applications. That is, holes in the gusset castings and the panels are smaller than the pins.

Final step was closing the pentagon opening. This was done by assembling a 5-piece aluminum cover on the ground and raising it into position. Altogether, more than 19,000 Huckbolt fasteners and about 200 conventional cadmium-plated bolts and nuts were used.

Commercial grade Huckbolt fasteners are 3/8 and 1/4 in. sizes. Pins were brazier-head type 2024-T4 aluminum alloy. Collars were of 6061-T67 aluminum alloy.

Fastener design precludes the possibility of hole broaching during assembly, as might happen by forcing a conventional threaded bolt.

Get Twofold Weld Protection With New Process

All forms of protection have been devised to keep air from harming a weld. Success depends on the effectiveness of the shield.

A new process protects in two ways—with flux and an inert gas.

▪ Air is an arc weld's biggest enemy. In the molten state, weld metal becomes extremely vulnerable to the contaminating effects of oxygen. Various ways have been used to protect the metal from these harmful effects.

Proper protection is essential. If you can get additional benefits from a shielding medium, so much the better. Actually, the shielding medium can do a four-way job: (1) stabilize the arc, (2) clean the metal surface, (3) refine the metal itself and (4) protect the weld during the cooling-off period.

Keeps Goals in Mind—National Cylinder Gas Co. kept all these goals in mind when it started to develop a new welding process. In fact, other factors were considered too. Things like good weld-bead shape, reduced spatter, acceptable speeds, high deposition rate and minimum post-weld cleaning were other objectives. Perhaps most important, if the process was to catch on, was that it had to be economical.

NCG now has such a process which it believes fills all these requirements for welding mild steel. Called Dual Shield, the process combines the use of a flux-cored electrode and a low-cost inert gas.

The flux in the cored welding wire is granulated. It includes an ionizer for arc stabilization, a deoxidizer to permit welding mill-run steel without removing scale, and another additive to form slag.

Two Jobs for CO_2—The blanket of CO_2 around the weld zone prevents contamination. But its second function is to inject a measured amount of oxygen directly into the arc stream. The oxygen combines with additives in the flux to purify the metal being welded.

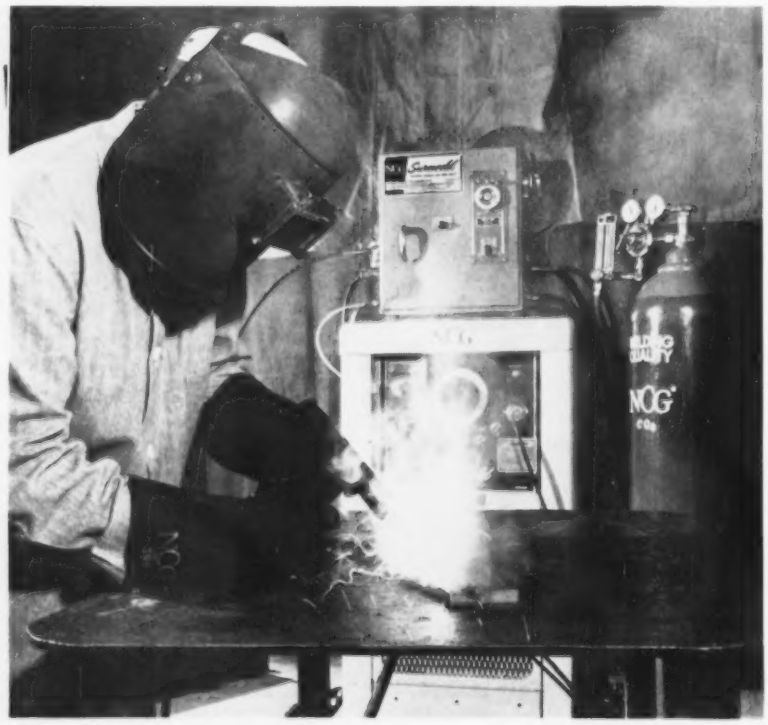
Welds made by this process are well-shaped and uniform. There's almost no spatter, thus very little post-weld cleaning. Penetration is said to be about 40 pct deeper than by manual welding. In fact, a single pass can easily weld the full thickness of ½-in. steel plate.

Good Visibility — Because flux enters from within the weld zone by means of the cored wire, welding action is visible to the operator. This feature affords good control as welding progresses.

Deposition rates are quite high. For example, using semiautomatic equipment and 3/32-in. diam wire, you can deposit 14½ lb of metal per hour. This rate is a few times higher than by manual welding.

Slag Pops Off—Preparing steel for welding often accounts for a sizeable part of the overall expense. It also takes valuable time from production. The same applies after welding in removing slag by chipping and chiseling.

The Dual Shield process bypasses most of these costly duties. The effectiveness of the cleaning action permits welding on scaly, oily or rusty steel. Yet, the welds



EASY TO USE: No particular skill is needed to make good welds at high rates of deposition. Technique can be learned in one day.

are sound. And as the slag shield cools, it pops off the weld surface giving it a clean, smooth appearance.

Easy to Learn—One day on the job should be enough for an operator to make satisfactory welds. Most of the technique can be picked up by watching a demonstration. This, plus a little instruction and a few practice passes, and the operator is ready to start paying his own way.

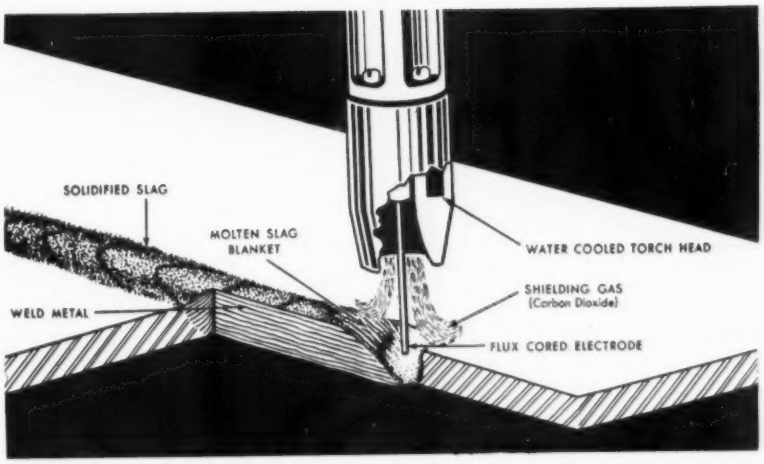
The gun through which the welding wire feeds weighs only 1½ lb. It's convenient to handle and not too tiring. Because of its small size, getting into close quarters isn't much of a problem.

How Setup Works—The heart of the setup is a welding control and wire drive unit. Its job is to keep arc voltage at a uniform level and to regulate the speed at which wire feeds to the welding gun through a flexible conduit. At this unit, the operator makes his preliminary adjustments for wire feed rate, flow of CO_2 and voltage output.

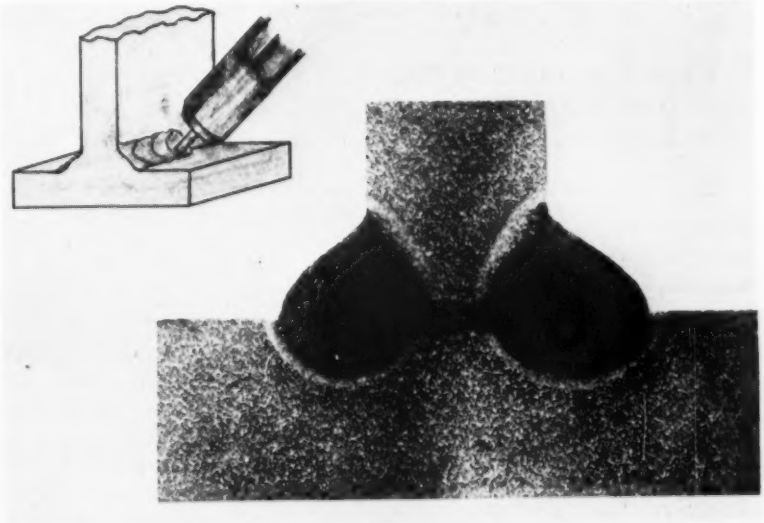
When he's about ready to start welding, he "inches" the wire so that it protrudes about ½ in. from the gun's nozzle. He then puts the end of the wire near the work, but not touching it, and pulls the torch trigger. This turns on the welding current and starts the wire feed. Once the wire touches the workpiece, the arc is established and wire feed is controlled automatically.

Where It's Used—Welding of mild steel is the intended field at the present time. The equipment can be used for single-pass welds in the horizontal and flat positions on thicknesses from 3/32 in. to ½ in. It'll make ¼-in. fillet welds at more than 20 ipm and butt welds on ¼-in. plate at more than 30 ipm.

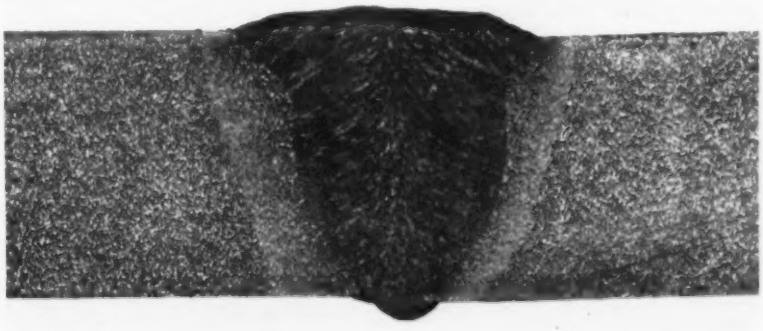
What about quality? Typical tensile strength is around 74,000 psi with a yield at about 61,000 psi. Elongation of a 2-in. specimen runs about 26.5 pct. Reduction of area is almost 60 pct. Welds are low in hydrogen—almost as low as those made with a low-hydrogen stick electrode.



DOUBLE PROTECTION: Flux in the electrode core and a shield of CO_2 work hand-in-hand to produce sound, uniform and clean welds.



UNIFORM WELDS: Once settings are made, the Dual Shield process makes smooth, uniform welds even on scaly, oily or rusty steel.



DEEP PENETRATION: A process feature is its ability to make one-pass welds in mild steel more than ½-in. thick.

Keep Production In Step With Simple System

LATE ENTRIES: Intra-plant communications update the boards, and help keep part output comfortably ahead of assembly line requirements.

Assembly lines need the right parts at the right time. Run out of parts and they bog down.

Close coordination of part production to assembly needs calls for spreading needed information. Foremen must get the word fast.

Simple records help foremen load machines smoothly at this plant.

▪ Plant foremen at Los Angeles' McCulloch Motors Corp. get complete, shift-to-shift reports on part production within 8 hours' time today. Statistics always lagged a full day (24 hours, 3 shifts) behind actual production previously.

Net effect — since McCulloch doesn't stockpile parts ahead—is smoother coordination between what a machine is turning out and what the assembly lines need.

Why It's Vital—The company makes five different engines. Only one is kept in continuous production. Full production facilities are thrown behind each of the others in turn. Monthly, upper-echelon meetings outline schedules and quotas for the following 90-day period. The plant's foremen then run their own departments, scheduling machines to meet overall commitments.

To help coordinate their operations without a hitch, McCulloch has adopted Remington Rand's Sched-U-Graph system. There are two keys to this system. First of these is a Daily Requirement Sheet (DRS), which carries to the foreman at the beginning of each day shift all the information that the big Sched-U-Graph board carries. Each DRS lists every part required to produce a specific engine, and opposite each, its production standing according to the current schedule.

Data Source—DRS information comes from one of five Sched-U-Graph boards, depending on which engine is being produced. The various foremen have, in turn, entered the information on these boards at shift's end. Each board has pockets for up to 200 part schedules.

Take a crankcase, Part No. 24077, as an example. In the individual pocket in the board assigned to the crankcase is a Production Status Card, heart of the system.

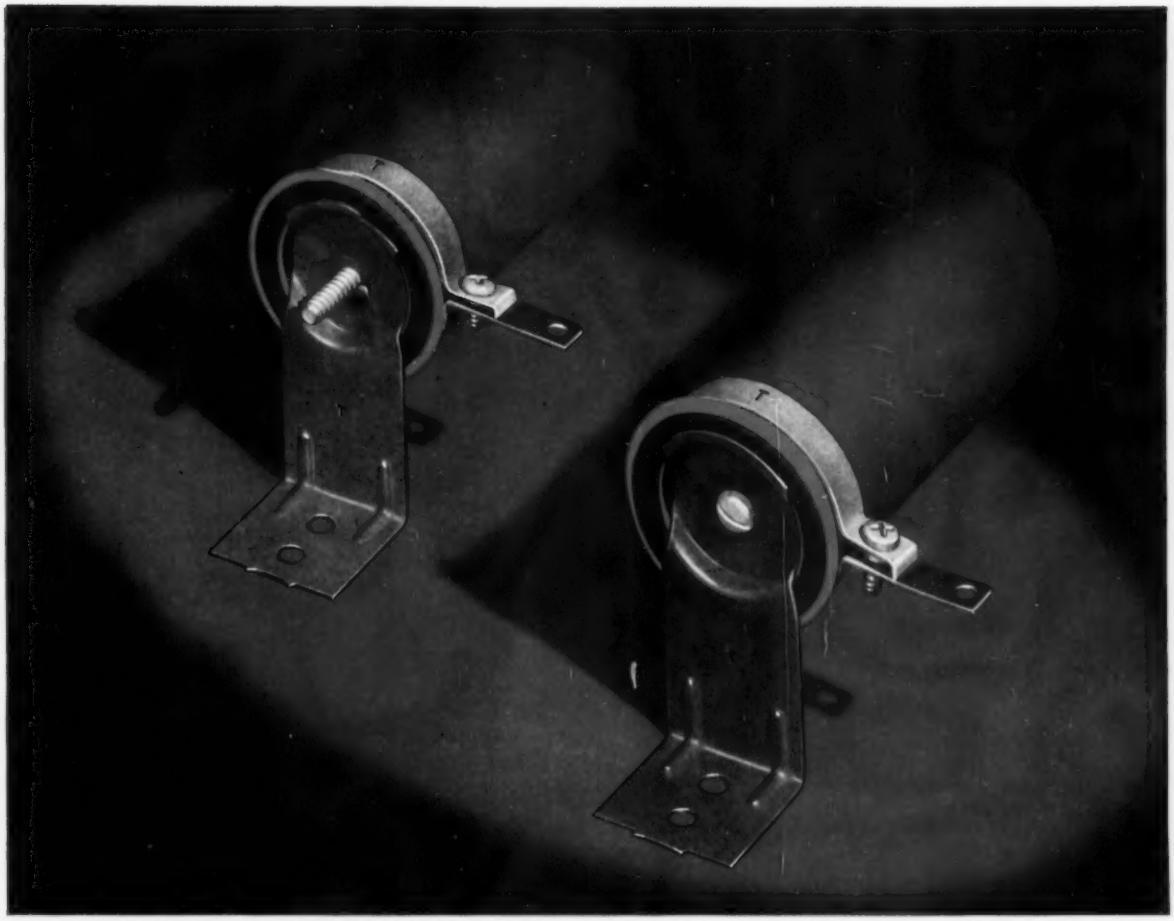
This card describes the part and tells through which departments it is routed during manufacturing. But most important are two notations—how many crankcases are required daily by the service department, and hourly usage, or total used each hour by the service department, in spares, and on the assembly line (scrap included).

How It Works—Say the Production Status card calls for 3690 crankcases in January. On Jan. 8, the Cumulative Production figures on the same card show 2722 produced. The important thing—and the basis for machine loading—is how many hours' of supply there are between crankcase output and the assembly line.

The last shift's figures showed 2722 produced, but the assembly line and spares had used 1604. This puts you 1118 units ahead of assembly. Hourly usage is 40, so you're 27 hours ahead of assembly.

The Catch—But another factor remains—lead time. This amounts to 40 hours from the time the raw casting leaves the mold until it arrives at assembly. So you're actually 13 hours behind assembly. All this information is set up visually on the Sched-U-Graph: The part by name, January's production requirement, then an orange signal positioned over a time chart. This divides into six days (McCulloch's work week) and 8-hour increments.

The orange signal shows at a glance exactly how many hours supply the particular part is ahead of assembly. The foreman knows immediately which machines to load and for which part.



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4 SPEED NUTS® eliminate 8 parts in resistor assembly, cut costs 50%!

Tremendous assembly savings are often possible when Tinnerman SPEED NUTS are "designed into" new products. This is an example: Corning Glass Works, Corning, New York, adopted 4 special SPEED NUT brand fasteners and cut assembly costs on new power-type glass resistors by 50%!

Assembling power resistors is normally a slow and complex operation. Yet a pair of one-piece, spring-steel SPEED NUT angle brackets eliminated 4 of the 9 parts required by another fastening method and cut assembly time to a few seconds!

These corrosion-resistant, vibration-proof fasteners hold the resistor under live spring tension to avoid mechanical shock. Locating washers, lock washers and nuts are eliminated. Also, one-piece SPEED CLAMPS® that double as terminal bands eliminate 2 lock washers and 2 nuts.

SPEED NUTS permit maximum assembly savings on *new* products, but you can probably make worthwhile savings *right now* on current products.

Over 8000 types available. See your Tinnerman representative or write for Bulletin 333-1.

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When a manufacturer is faced with cost increases, the easy thing to do is to pass the increase on to the customer. We're faced with this temptation just like everyone else. In the past 20 years, our wage rates have risen to over three times their old level; the composite price of steel has risen to about 2½ times the old price; taxes, shipping, equipment costs have all multiplied similarly. But just as we are under this pressure to *raise* our prices accordingly, we are also under pressure from you the customer to keep the price of our product within reason. There is only one way out of this dilemma for us — to improve our efficiency. And that is what we are constantly doing — with new, more efficient machines and equipment, and improved production facilities. Machinery and methods of even a few years ago are inadequate by today's standards of competition. For this reason, if you've traditionally been making your own gears, or obtaining them from a small shop in the neighborhood, we suggest you consult your nearest Cincinnati Gear representative to see how our ultra-modern set-up compares *today* — and find out what we can do for you in the three important categories of quality, service, and price on your custom gear needs.

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 129.

Batteries

Industrial truck batteries are described in an 8-page bulletin. It gives details of battery construction. Also listed are engineering specifications for the three available ampere-hour capacities (40, 60 and 120) and data on the company's industrial truck discharge indicator. (Gould National Batteries, Inc.)

For free copy circle No. 1 on postcard p. 129

Snagging Wheel

A recently issued folder shows a new snagging wheel for foundry use. (Sterling Grinding Wheel Co.)

For free copy circle No. 2 on postcard p. 129

Die Sets, Springs

Die sets, die springs and other diemaker accessories are described in a company publication. (The Producto Machine Co.)

For free copy circle No. 3 on postcard p. 129

Colored Welded Coil

Manufacturers can now turn out finished aluminum products in colors directly from roll-forming machines, press brakes or draw or punch presses. Subsequent finishing operations are unnecessary. This is done with a new pre-enameled prefinished aluminum coil available in widths from one-half to 36 in. and thickness from 0.016 to 0.051 in. A brochure describes the material. (Reynolds Metals Co.)

For free copy circle No. 4 on postcard p. 129

Recirculating Ovens

Recirculating ovens appear in a pair of bulletins. Shown and described are: standard bench type, standard cabinet type and standard truck type units. (W. S. Rockwell Co.)

For free copy circle No. 5 on postcard p. 129

V-Belts

What do you do when V-belts stretch or break? A folder poses and answers this question. It gives data on V-belt maintenance, inventory, wear, vibration. The brochure features an adjustable link V-belting which it says has less vibration with faster belt changing. (The Manheim Mfg. & Belting Co.)

For free copy circle No. 6 on postcard p. 129

Gear Hobber

A tandem gear hobber for tailoring gear output to need is described in a 8-page bulletin. (Michigan Tool Co.)

For free copy circle No. 7 on postcard p. 129

Research

A 32-page booklet portrays various research activities aimed toward producing better steels. (Crucible Steel Co. of America.)

For free copy circle No. 8 on postcard p. 129

Belt Drives

With 112 pages, an engineering data book shows selection and design of belt drives. It contains

charts, tables, diagrams, and specifications for all drive sizes. In addition, comprehensive data on V-belt drives is included, covering drive tables, hp ratings, installation instructions and trouble shooting. (Manhattan Rubber Div., Raybestos-Manhattan, Inc.)

For free copy circle No. 9 on postcard p. 129

Heating Elements

"Hot Tips" is the title of a 12-page booklet covering silicon carbide heating elements. It offers data on handling, unpacking, storage, installation and replacement of heating elements. (Globar Div., The Carborundum Co.)

For free copy circle No. 10 on postcard p. 129

Millivoltmeter

A bulletin shows a portable millivoltmeter recorder for electrolysis survey work. Its four pages describe the instrument's use in surveys of electrolytic corrosion and deterioration of underground structures such as pipe and cables. (The Bristol Co.)

For free copy circle No. 11 on postcard p. 129

Heaters, Burners

A pair of catalog sheets cover a firm's oil burners and electric oil heaters. The burners allow for individual adjustment of oil and air. The heaters offer automatic temperature control for heating heavy fuel oil grades. (Hauck Mfg. Co.)

For free copy circle No. 12 on postcard p. 129

Screw Machines

Screw machine tools are shown in an 8-page illustrated bulletin. It lists new tools for a manufacturer's new automatic screw machine. It includes listings, capacities and dimensional data. (Brown & Sharpe Mfg. Co.)

For free copy circle No. 13 on postcard p. 129

Centrifuge

Continuous discharge centrifuges are covered in a 4-page brochure. Use to separate, clarify, classify, or concentrate liquid or liquid-solid

Specify *Michigan* Tubing for economy and versatility

A Quality Product

ROUND

¼" to 4" O.D. 7 to 22 gauge

SQUARE	Gauge	RECTANGULAR
⅜" to ¾"	16 thru 22	⅜" minimum side to 5" maximum side
¾" to 1"	11 thru 22	
1" to 2"	11 thru 20	
2" to 3"	11 thru 18	

Carbon 1010 to 1025

Standard Sizes

Tube Diameter O.D. Size	Maximum Wall Decimal	BWG Gauge	Minimum Wall Decimal	BWG Gauge
¼	.065	16	.022	24
⅓	.083	14	.022	24
⅜	.095	13	.022	24
¾	.095	13	.022	24
⅞	.095	13	.028	22
1	.095	13	.028	22
1⅛	.095	13	.028	22
1¼	.095	13	.028	22
1⅜	.095	13	.035	20
1½	.095	11	.035	20
1⅝	.120	11	.035	20
1¾	.120	11	.035	20
1⅞	.120	7	.035	20
2	.180	7	.035	20
2⅛	.180	7	.035	20
2¼	.180	7	.035	20
2⅜	.180	7	.035	20
2½	.180	7	.035	20
2⅝	.180	7	.035	20
2¾	.180	7	.035	19
2⅞	.180	7	.042	19
3	.180	7	.042	19
3⅛	.180	7	.042	19
3¼	.180	7	.042	18
3⅜	.180	7	.049	18
3½	.180	7	.049	18
3⅝	.180	7	.049	18
3¾	.180	7		
3⅞	.180			
4				

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Michigan has been manufacturing tubular parts for leading manufacturers. This acceptance of Michigan tubing has been won by meticulous attention to customer requirements and the supplying of the very best in tubing. The following advantages of low cost manufacture and utmost dependability are yours when you specify Michigan for tubular parts in the fabrication of your products:

1. **It is fabricated in round, square and rectangular shapes, in a wide range of sizes;**
2. **It is always of uniform strength, weight, ductility and weldability;**
3. **It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted and rolled.**
4. **Complete facilities for the COLD DRAWING, ANNEALING and TESTING of tubing we manufacture.**

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for engineering and technical help in the selection of tubing best suited to your needs.

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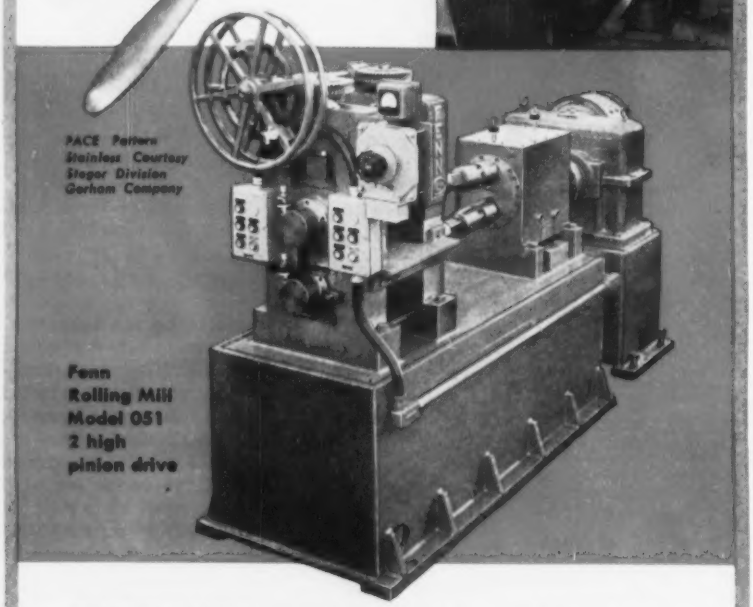
a pinch that pays on stainless steel



PACE Pattern
Stainless Courtesy
Stegor Division
Gorham Company

Fenn
Rolling Mill
Model 051
2 high
pinion drive

FENN ROLLING MILLS, because of their flexibility and dependability, have been adopted as standard mills in many vertical segments of the metal working industry. In the manufacture of flatware, for example, Fenn rolling mills are in use by nearly every major producer. These mills are specifically designed to meet the flatware manufacturers' precision requirements for grading, pinch rolling and cross rolling.

The Fenn Model 051 mill, shown above, is in operation at the Stegor Division, The Gorham Company, Providence, R. I. In a two-pass operation, .095 ga. tableware blanks of 430 stainless steel are pinch rolled with .027" reduction taken on the first pass, and .013" reduction on the second. Production rate is more than 200 pieces per hour with dimensional tolerances held to ±.001".

For complete information on Fenn Rolling Mills write for Catalog RM 56 or, better still, let Fenn engineering service study your requirements for specific recommendations.

FENN Rolling Mills

THE FENN MANUFACTURING COMPANY, 302 FENN ROAD, NEWINGTON, CONN.

FREE LITERATURE

moisture high in solid content, the centrifuges continuously discharge all phases including solids. (De Laval Separator Co.)
For free copy circle No. 14 on postcard p. 129

Barrel Finishing

Six pages introduce what a new brochure says is the world's newest, largest and most modern precision barrel-finishing laboratory. (Lord Chemical Corp.)
For free copy circle No. 15 on postcard p. 129

Bevel Gear

Standardized right angle bevel gears for industrial applications are illustrated in a bulletin. (Airborne Accessories Corp.)
For free copy circle No. 16 on postcard p. 129

Induction Heating

A 12 page publication covers induction heating. It offers ideas on simplifying manufacturing operations where heat is required. (Lepel High Frequency Laboratories, Inc.)
For free copy circle No. 17 on postcard p. 129

Time Delay Relays

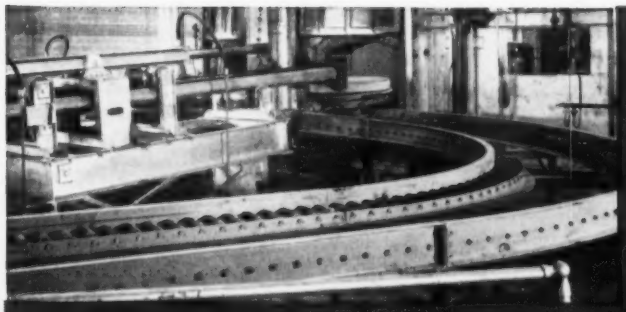
Replacing pages 7 and 8 of a firm's current catalog is a bulletin that details the construction of three basic time delay relays in new extruded hermetic housings. These are supplied on ac, dc, and 400 cycle timers. (A. W. Haydon Co.)
For free copy circle No. 18 on postcard p. 129

QD Couplings

Quick-connect, quick-disconnect couplings are described in a bulletin. (Snap-Tite, Inc.)
For free copy circle No. 19 on postcard p. 129

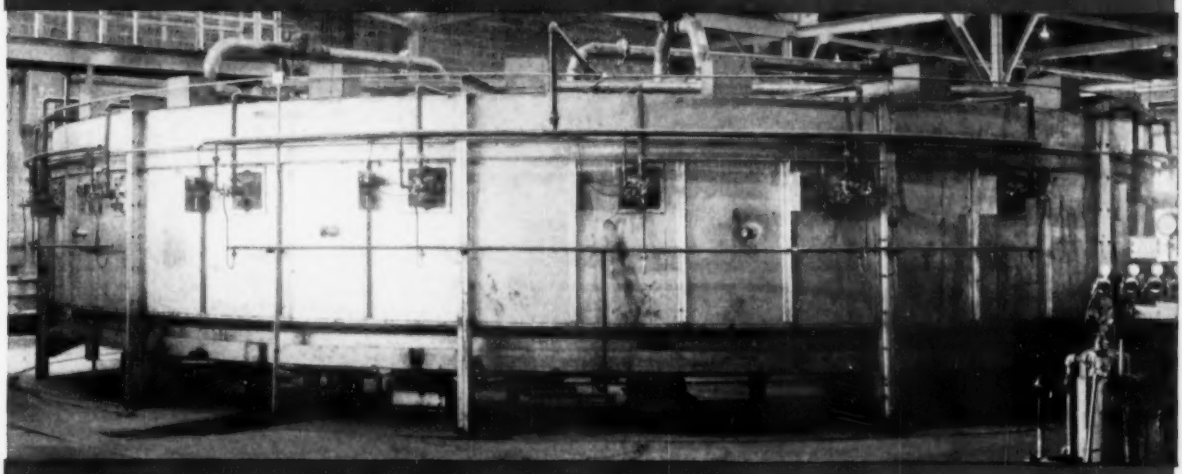
Conveyors

Features and applications of in-floor conveying setups and overhead Tow-conveyor systems are presented in a 42-page booklet. (Jervis B. Webb Co.)
For free copy circle No. 20 on postcard p. 129



This furnace is set up for automatic loading in regular plant production line.

This field-erected Lindberg rotary hearth furnace is one of several completed, under construction and on order, for plants in U. S. and Canada.



Every so often we want to remind you . . .

LINDBERG Builds Big Ones!

Yes, Lindberg does build big ones! The rotary hearth furnace shown here was field-erected by Lindberg Industrial. It is used for heat treating car wheels and is set up for automatic loading. It's outside diameter is 44 feet and capacity is over 13,000 lbs. per hour.

This is just one of many types of industrial heating equipment, heat treating furnaces, melting furnaces, enameling furnaces, ceramic kilns, that Lindberg is prepared to design, construct and install in your own plant.

Lindberg's years of experience in the broad field of industrial heating equipment, its staff of expert laboratory technicians and seasoned application engineers assure your getting the best suited installation for your process and production requirements.

Whatever your needs, if it has anything to do with the application of heat to industry, better talk it over with Lindberg. Just get in touch with your nearest Lindberg Field Office (see your classified telephone directory) or write us direct.

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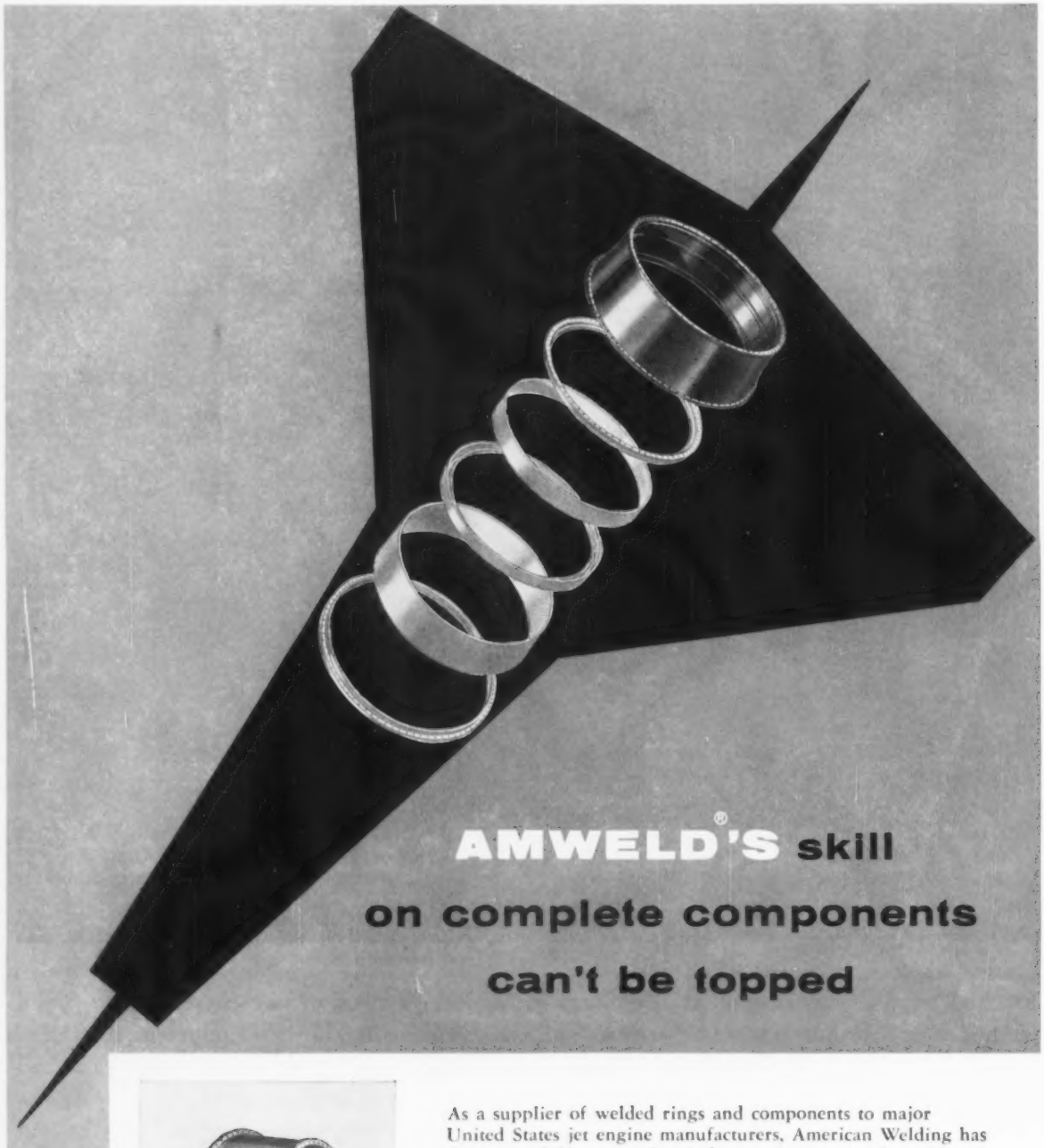

AMWELD® skill
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As a supplier of welded rings and components to major United States jet engine manufacturers, American Welding has proven its skill as part of an industry where cost and precision are vital factors. As the missile and rocket programs grow from the experimental to the production stage, Amweld's experience and skill can play a part in these essential programs.

If you have a problem that can be solved by a rolled and welded ring or component, or any welded fabrication, contact American Welding's Industrial Products Division. Their skill, experience, and engineering are at your service.

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AMERICAN WELDING
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FREE LITERATURE

This section starts on Page 124

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Metal Diffusion

Metal Diffusion resulting in a stainless alloy surface to protect steel and ferrous products from wear, corrosion and heat is discussed in a brochure. It describes a process employing atom exchange to create a chrome-rich surface on ferrous metals. (Alloy Surfaces Co.)

For free copy circle No. 21 on postcard

Grinding Wheels

Grinding wheels for foundry snagging appear in a 4-page folder. These wheels, it says, are fast, cool and efficient. (Peninsular Grinding Wheel Div., Abrasive & Metal Products Co.)

For free copy circle No. 22 on postcard

Thread Roller

Containing 16 pages, a bulletin completely describes a thread rolling machine. The unit, it states, produces strong, accurate threads of excellent finish in a chipless, cold forming process. It rolls 3/16 to 3 in. diam, left or right hand threads of all types. (Landis Machine Co.)

For free copy circle No. 23 on postcard

Barrel Finishing

Precision barrel finishing equipment and supplies are reviewed in an 8-page brochure. It pictures many models. (Speed-D-Burr Corp.)

For free copy circle No. 24 on postcard

Presses

Selecting the proper press for various work is discussed in a 50-page booklet. It contains data and alignment diagrams for computing pressure and sustained work capacity of presses. Also, it provides information, formulae and charts on blanking and shearing; drawing and reducing; ironing; coining, sizing and forging, and extrusion. (E. W. Bliss Co.)

For free copy circle No. 25 on postcard

Seamless Tube

Tables of bursting pressures of seamless steel tubing are contained in a folder. It tells how to figure bursting pressures from the tables. (Pacific Tube Co.)

For free copy circle No. 26 on postcard

Thread Revisions

Proposed new 1957 revisions of Unified and American Screw threads are presented in a 12-page publication. The booklet concerns thread standards covering these type threads. It presents the major, minor and pitch diameters giving the classes, allowances and tolerances of all internal and external threads up to and including 2 in. (The Eastern Screw Machine Corp.)

For free copy circle No. 27 on postcard

Deburring, Chamfering

Tools for deburring, chamfering and countersinking are shown in a 4-page bulletin. Illustrations, text and tables show the tools and explain fully their applications. (Nobur Mfg. Co.)

For free copy circle No. 28 on postcard

Training Center

Illustrated in color, a 6-page folder show a firm's new training and demonstration facility. (Brown & Sharpe Mfg. Co.)

For free copy circle No. 29 on postcard

Industry Real Estate

An analysis of Colorado's industry and its potential for industrial development appears in a new book. It carefully details many advantages in locating future industrial plants in the state. Among these, the book lists it's high, dry, sunny climate as one outstanding asset. Also given

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 4/18/57

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FREE LITERATURE

are facts on: present manufacturing and growth possibilities, population, markets, labor, abundant natural resources, research services, and transportation. A map shows rail, air and highway setups. Noteworthy is a section on nonferrous metals. (Colorado Dept. of Development).

For free copy circle No. 30 on postcard

Tubing Facilities

One firm's facilities for handling a wide variety of tubing requirements are described in a booklet. It contains a fold-out flow chart which takes the reader on a pictorial tour through the tube-producing process. (Ohio Seamless Tube Div., Copperweld Steel Co.)

For free copy circle No. 31 on postcard

Dumpers

Manual and electric lifts for dumping barrels, drums and similar containers are described in a data sheet. All models, however, adapt to handle skids, pallets, and box trucks. They come in capacities up to 2000 lb. (Uhrden, Inc.)

For free copy circle No. 32 on postcard

Offset Pipe Rolls

Offset rolls and gages that reduce industrial pipe and elbow edging to a single operation are described in a data sheet. (Niagara Machine & Tool Works).

For free copy circle No. 33 on postcard

Beryllium Copper

Reading material on Beryllium copper offers a flash review of 33 different applications. Attached is a postcard, which when filled out and mailed, brings more detailed data on the subjects. (The Beryllium Corp.)

For free copy circle No. 34 on postcard

Filters

Six major filter types for industrial applications are reviewed in an 8-page brochure. Filters offered include disposable media gravity type, combination gravity and magnetic, straight magnetic, vacuum, pressure and screen-type settling filters. (Industrial Filtration Co.)

For free copy circle No. 35 on postcard

Cleaning

Industrial cleaning and maintenance products and services are described in a company's literature. Also covered are paint stripping methods and materials. Detailed in separate bulletins are: (1) a light reflective paint spray booth coating, (2) an acid type exterior cleaner for railway locomotives, (3) a hot soaker tank cleaner for aluminum and other soft metal parts, (4) a viscous organic liquid cold stripper and (5) a peelable white plastic spray booth film coat. (The DuBois Co., Inc.)

For free copy circle No. 36 on postcard

Vinyl On Metal

It looks like plastic but it's really metal. That describes a new material shown in a 4-page folder. Actual samples of the material show how vinyl joins with metal to give an unusual finished product. Sample pieces of aluminum and steel show that the plastic imparts them with a brightly colored and unique surface. (The Masland Duraleather Co.)

For free copy circle No. 37 on postcard

Magnets

Cast and sintered permanent magnets are covered in a 12-page catalog. The publication includes information on magnetic and mechanical properties, approximate tolerances, magnet assemblies, sales and service. (Magnetic Materials Section, General Electric Co.)

For free copy circle No. 38 on postcard

Welders

Three-phase resistance welding machines are listed in a dozen-page bulletin. It explains their operational principles, describes associated control equipment and illustrates in-plant use of the welders. (Taylor-Winfield Corp.)

For free copy circle No. 39 on postcard

single stand reversing plate mill

BLAW-KNOX
PLATE MILLS

Blaw-Knox designs and builds a full range of continuous or single stand reversing plate mills for rolling ferrous and non-ferrous slabs. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron, and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

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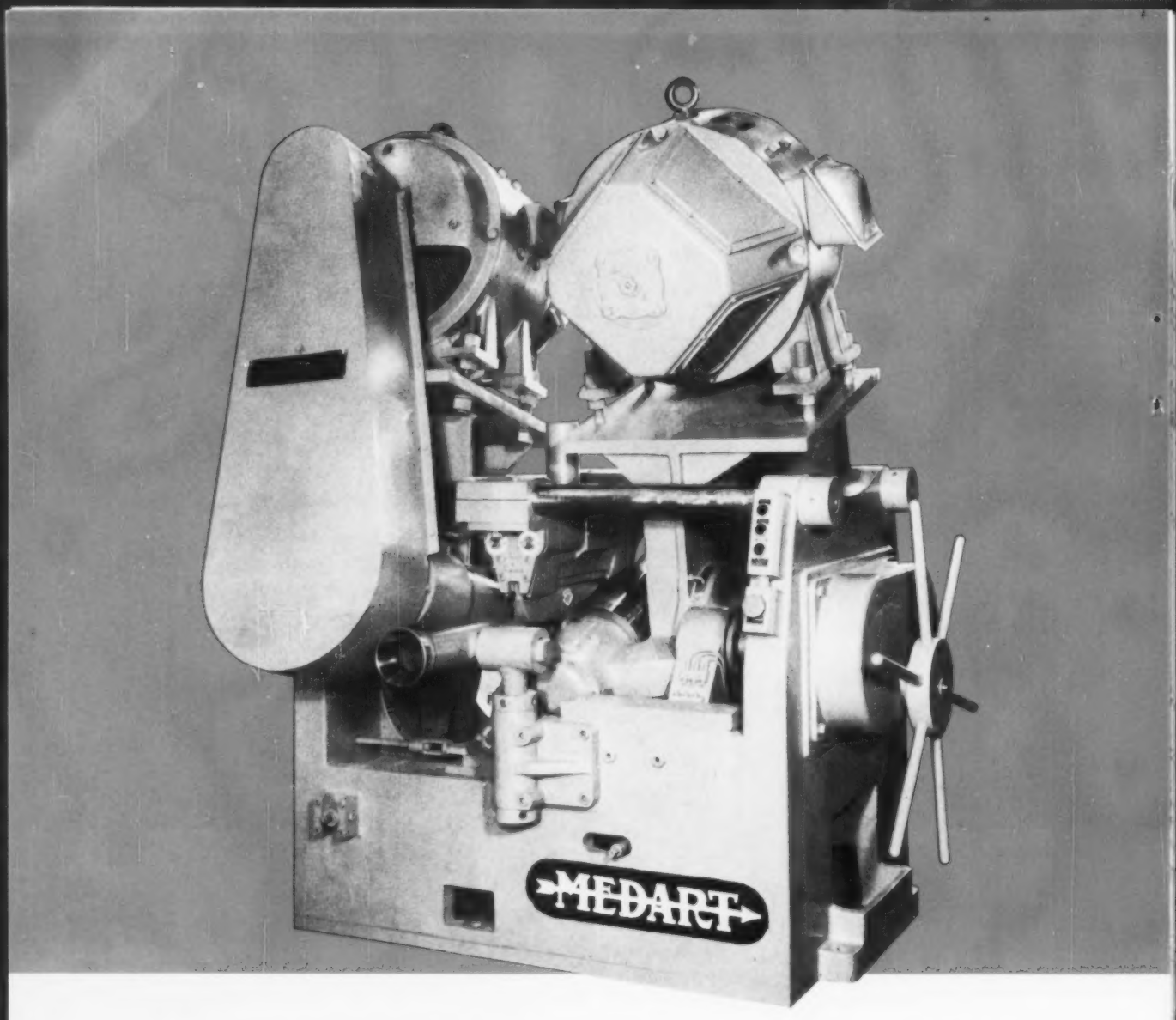

BLAW-KNOX MEDART makes what it takes

for high speed straightening of cold finished stock

Designed around the principle used in the famous Blaw-Knox Medart 2 roll Rotary Straightener, the 2 & 2 Universal Straightener is especially adapted for high speed applications. It is widely used in a direct production line with a draw bench for high speed straightening of cold drawn bars.

In this machine, each roll is driven by its own motor through a completely enclosed V-Belt drive. This simplified arrangement keeps downtime and drive maintenance to a minimum. What's more it provides for control of throughput rates by varying the speed of the motors. Roll speeds are synchronized by means of electrical interlocks between the motors.

Space requirements are kept to a minimum through compact design and the small number of working parts. This compact setup simplifies discharge of work from the machine, making it ideally suited to shorter length workpieces.

The Blaw-Knox Medart 2 & 2 Universal Rotary Straightener and Polisher is available in sizes to handle bars and tubes in diameters of ⅛″ to 4½″. Contact us for detailed information, technical assistance or service.

BLAW-KNOX

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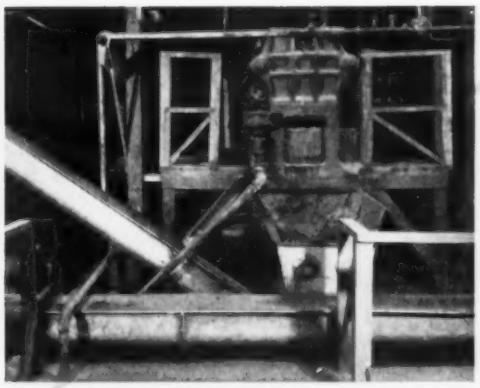
Foundry & Mill Machinery Division

Blaw-Knox Building • 300 Sixth Avenue

Pittsburgh 22, Pennsylvania

CONTINENTAL

by conveyor belts



by spiral conveyors

If you move materials

by bucket elevators

by scraper conveyors

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equipment incorporating the know-how gained in three-quarters of a century of studying and solving material-handling problems. Today, in thousands of plants throughout the world, Jeffrey conveying equipment is depended upon to maintain high production schedules, lighten the burden of labor and reduce operating costs.

Write for Catalog 860 describing Jeffrey material-handling and processing equipment. For high quality parts matching those originally installed on your equipment, get in touch with a nearby Jeffrey distributor or The Jeffrey Manufacturing Company, Columbus 16, Ohio.

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the ONLY **PORTABLE NIBBLER** *that* **CUTS METAL** *Without Distortion!*

Model HN for 10-Gauge Stainless and 8-Gauge Mild Steel. 6" radius.

Pneumatic Nibbler for 10-Gauge Stainless and Mild Steel. 6" radius.

Model MN for 14-Gauge Stainless and 13-Gauge Mild Steel. 1" radius.

Model LNC for 16-Gauge Corrugated Sheet Metal and Sheet Metal Pipe. 1" radius.

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Philadelphia 34, Penna.

PAT. #2078174 #2078311 #2535631

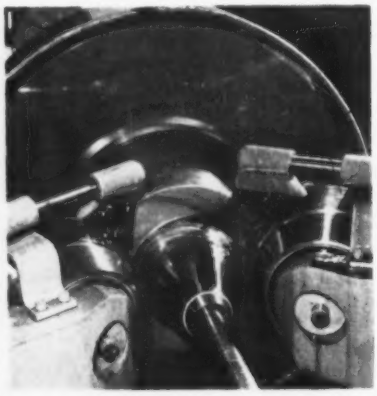
Distributed by EASCO PRODUCTS

Machine Parts Without Chips

When a lathe turns, chips fly. So does money. Even if you sell the shavings as scrap you still waste money.

So you're ahead if you can machine your objects without producing chips.

▪ Why pay for something and then throw it away? This is a question many manufacturers and machinists ask themselves when they see a pile of chips in a lathe pan. These chips, of course, come off metal that costs money. Even when they are sold for scrap, the shavings won't bring the price paid for them as stock.



Cone takes shape as rollers press forward on the metal.

It isn't surprising, then, that there is a growing interest in chipless machining. Chipless machining is the shaping of metal without cutting off any of the raw material.

Flow-turn Units — Especially interested in application to the aircraft industry, Pratt & Whitney's advanced tool engineering section has been pushing chipless machining's development. Lodge & Shipley, a machine tool manufacturer, built several flow-turn machines for the aircraft concern. The first three units were delivered in 1953. Immediately upon delivery, Pratt & Whitney engineers at West Hartford, Conn. began turning out several jet-turbine parts on them. The amount of material saved surprised the firm.

It proved faster than other methods, and engineers reported that it resulted in a more uniform part. Most parts are made without welds.

Into Production—After a considerable period of development, the firm began manufacture of production parts. In the meantime, several machine companies began building similar units. Pratt & Whitney ordered a Cincinnati Hydrospin and a Bullard vertical flow-turn machine. In 1956 flow-turn was established as a separate department.

Six major parts and several small parts are now being made in the department. More parts are being designed with this method in mind. Still other applications for flow-turn are in sight for the future.

The principle of flow-turning is similar to that of rolling out sheet metal. Instead of being rolled out flat, however, the metal is stretched over a conical or cylindrical shaped

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 129. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

piece, called a mandrel. High-speed spinning of the metal disc of raw material enables the rollers, which control the thickness of the part, to perform a uniform job.

The amount of metal needed can be figured in advance. Thus, no metal goes to waste. An example of this is a jet compressor case which, by the old method of machining, required 148 lb of raw material in eight pieces. By flow-turn the same part required 77 lb of raw material extrusion.

Tool engineer removes cone from machine's mandrel.

Belts Carry Much Ore

If you transport bulk materials, you probably use rubber conveyor belts. If not, chances are that these belts could solve some wear problems for you. Take the problem that faced the Holman Clifts Mine at Taconite, Minn. for example. The operators needed a material that wears well for conveying iron ore from a screen crushing plant at the mine face to a concentrating plant at the mine rim.

They chose two giant high-strength conveyor belts made by United States Rubber Co. of New York City. The belts combine cellulosic fibers and nylon. Covering these is a specially compounded rubber.

Last Long—The two were installed five years ago. Since then, they have carried over 6-million

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All seven are conveniently located in principal industrial areas.

Each is staffed by expert metallurgists, and is well-stocked to give you speedy service.

Fill your current needs by ordering our own HY-TEN steels, the "standard steels of tomorrow", or standard AISI or SAE grades.

Or write today to our Cambridge office for your *free* Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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WHEELOCK, LOVEJOY & COMPANY, INC.
126 Sidney Street, Cambridge 39 Massachusetts

tons of iron ore. They have never been shut down except for periodic maintenance.

The first conveyor, 884-ft long, lifts ore a vertical distance of 170 ft. The ore then moves onto the second conveyor, 897-ft long. This lifts the ore an additional 201 ft. Running speed is 650-fpm; they carry 1100-tons an hour.

Grab Buckets Handle Hot Slag

This four-cubic-yard slag grab, shown before shipment from the Harrison, N. J., plant of the Mead-Morrison Division of McKiernan-Terry, is one of three ordered for United States Steel's Youngstown plant. It will handle hot open-hearth slag.

Specially designed and fabricated for the purpose the buckets feature a special reeving arrangement and special steels. They also incorporate a new link-type hinge alignment device that prevents grab damage due to jamming of the noncrushable slag in the gear teeth of conventional alignment devices.

For Rugged Service—The closing lines are reeved in the bight of the line, while the holding lines are dead-ended on the top head of the bucket. The shells and jaws of the grabs are fabricated of extremely hard, chrome-nickel-molybdenum steel.

Shells and jaws are of chrome-nickel-molybdenum steel.

The sheaves and fairleader rollers are equipped with roller bearings. All other bearings are rolled manganese steel bushed. Jamming and breakage common with gear-type hinges is eliminated entirely by a new link-type hinge, specially developed for use with noncrushable materials.

This is completely enclosed and operates through a linkage of steel plates fabricated entirely of USS T-1 steel.

Setup Brazes, Hardens

In producing drills, reamers and carbide tools, a firm now brazes and hardens in the same process. The technique utilizes a special high temperature brazing alloy and a controlled furnace. This setup lets Whitman & Barnes, Plymouth, Mich., braze the carbide tip at the

ACTIVATED CLEANING
breaks phosphatizing bottleneck
Hey, Joe, these door panels need two coats of paint. What's wrong?
Can't control the phosphate coating weight—crystals are too big. We'll hand rub the next few panels.
Hi, Jim, get me out of this jam. We need a uniform, lightweight zinc phosphate coating.
You're talking my language, Joe. Ever hear of Pennsalt activated cleaning and Fosbond?
In your normal cycle, and with no hand rubbing, Pennsalt activated cleaning gives you a refined, lightweight Fosbond coating.
"But how does Pennsalt know so much about phosphate coating? It's a pretty new field."
"We called on our wide knowledge of all phases of metal surface preparation—cleaning, surface-activation, and phosphatizing . . . Don't forget, nobody knows more about metal-processing chemistry than Pennsalt."
A MONTH LATER

same time it hardens the high speed steel body.

The process results in uniform body hardness, says the company. Also, the carbide tips do not loosen due to braze failure. The drills dry-drill cast-iron without fear of braze softening or melting.

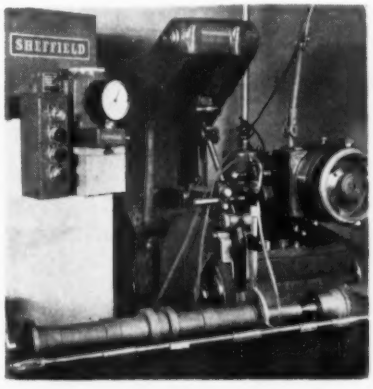
The drillmakers are making public information on the process.

Built-in Checks Make Automation Complete

During the last quarter-century, precision measurement moved from hand methods to semi-automatic means. Now another move is on. This is toward complete automation, of course. An important factor in this trend is built-in quality controls. These controls affect both partially automated single machine tools as well as completely automatic and integrated production lines.

Built-in controls make precision measurements; if these do not meet required tolerances, the units make corrections automatically.

Senses Mistakes—Research and development work at Sheffield Corp., Dayton, is producing a growing variety of gaging-and-feedback tools. To provide complete control, each gaging system includes a cartridge or size sensing element. It also has indicating and amplifying components. On machine tools, most setups are of the air type. These use pneumatic-electric or pneumatic-electronic amplification.

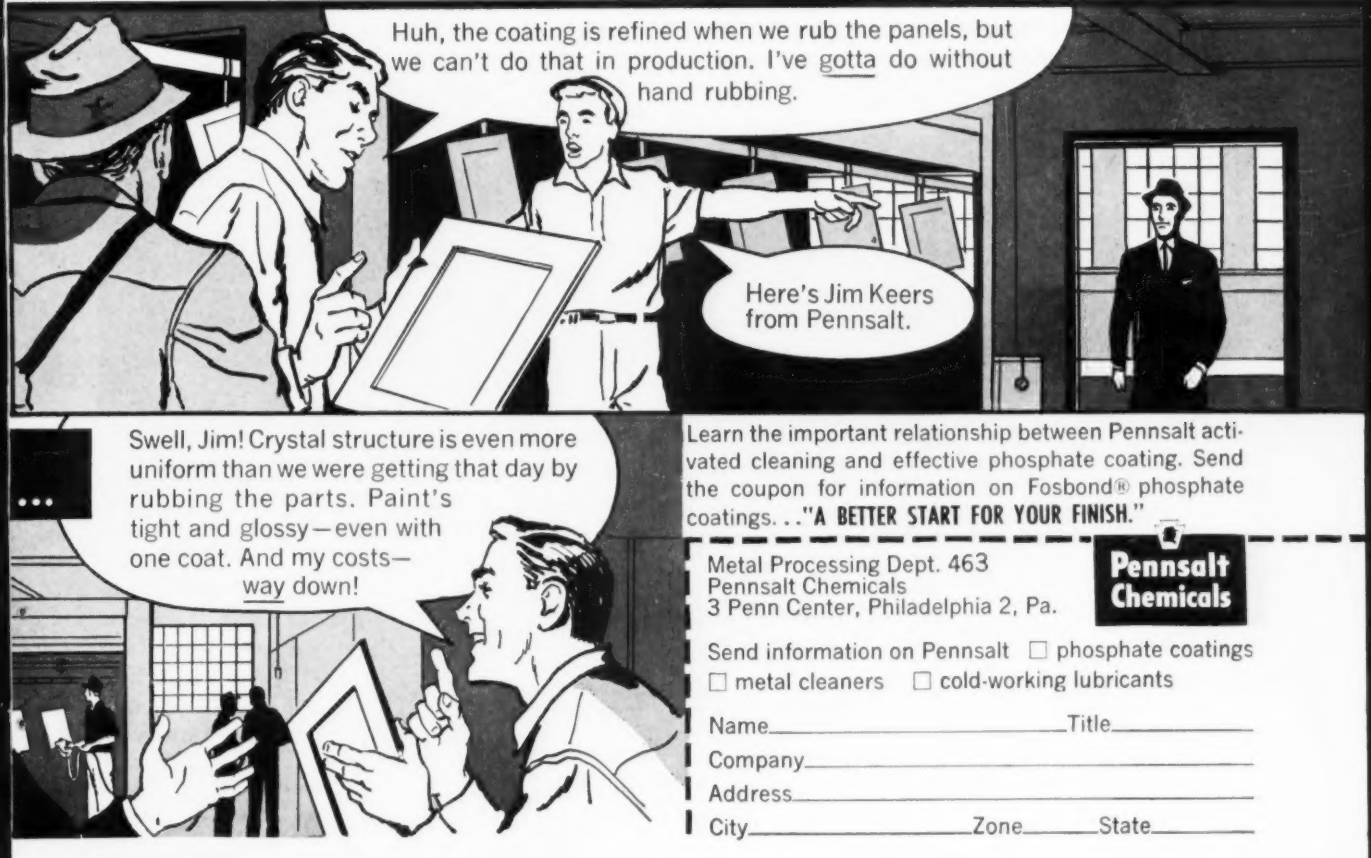


This unit assembles and inspects roller bearings.

The units gage either location or size. This data feeds back to provide in-process control, post-process control. Sometimes the controls handle final inspection, assembly operations or parts straightening.

What's What—In-process control provides automatic control with feedback from the sensing element as it gages a part during forming. Post-process or station gaging gets done immediately after machining or forming. This works at a point either adjacent to the tooling or at some remote point.

One completely automatic machine assembles and inspects taper roller bearings at a rate of 1000 bearings per hour. It gages the diameter and flange thickness of the inner race; then it selects the proper roller size and assembles them with a cage. Assembled bearings are then gaged for torque and "stand-


Huh, the coating is refined when we rub the panels, but we can't do that in production. I've gotta do without hand rubbing.
Here's Jim Keers from Pennsalt.
...
Swell, Jim! Crystal structure is even more uniform than we were getting that day by rubbing the parts. Paint's tight and glossy—even with one coat. And my costs—way down!

Learn the important relationship between Pennsalt activated cleaning and effective phosphate coating. Send the coupon for information on Fosbond® phosphate coatings. . ."A BETTER START FOR YOUR FINISH."

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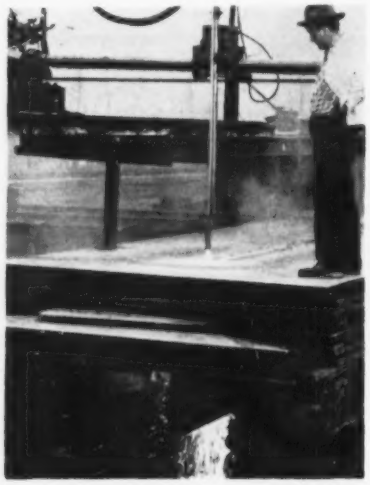
out" before leaving the machine.

Operator Going—In these and other applications, the automatic gage takes over more and more operator and inspector functions. And it performs them rapidly and accurately.

Portable Unit Cuts Scrap

Cutting iron and steel scrap has been speeded up at Deitch Co., Pittsburgh, by a semi-portable flame cut-off machine. It has replaced much of the firm's manual flame cutting. While non-automatic, the machine has a control assembly that permits operation from a central position.

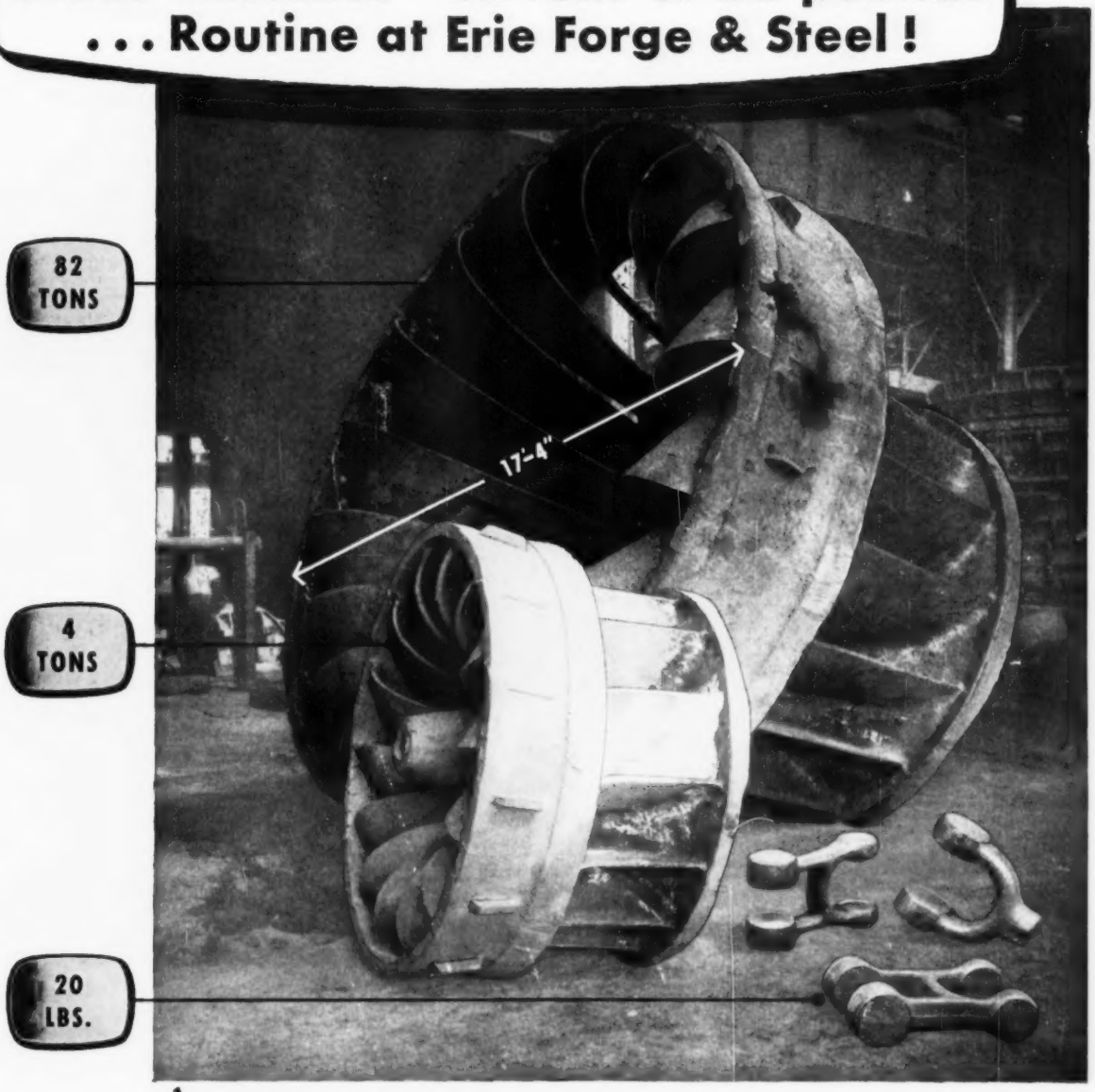
The cut-off unit, manufactured by National Cylinder Gas Co., consists basically of an 18-in. structural steel guide rail, a carriage,



Here the torch cuts through a 32-in. stack of plate.

and a torch truck that travels on a boom. The boom horizontally rotates about the center of the carriage. Thus, the torch truck and torch can be located anywhere within the circle covered by the boom. Separate mechanical clutches control the torch motion either parallel to the truck or along the boom. The three-hose mill torch

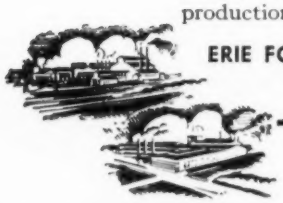
STEEL CASTINGS - 82 tons or 20 pounds ... Routine at Erie Forge & Steel!



A LONG JUMP from "the largest steel water wheel ever cast in one piece", 82 tons of it, to a 20 lb. engine casting ... Routine at Erie Forge & Steel. Here is definite proof of our versatile production capabilities.

Engineers and metallurgists team up here with skilled craftsmen to control the production of steel castings and forgings from raw materials to finished product.

For example, engineering, metallurgy and production followed the 82 ton casting every step from raw materials to railroad spur to assure dimension and specification accuracy. "One responsibility and one control" is more than a slogan — here, it works for you.



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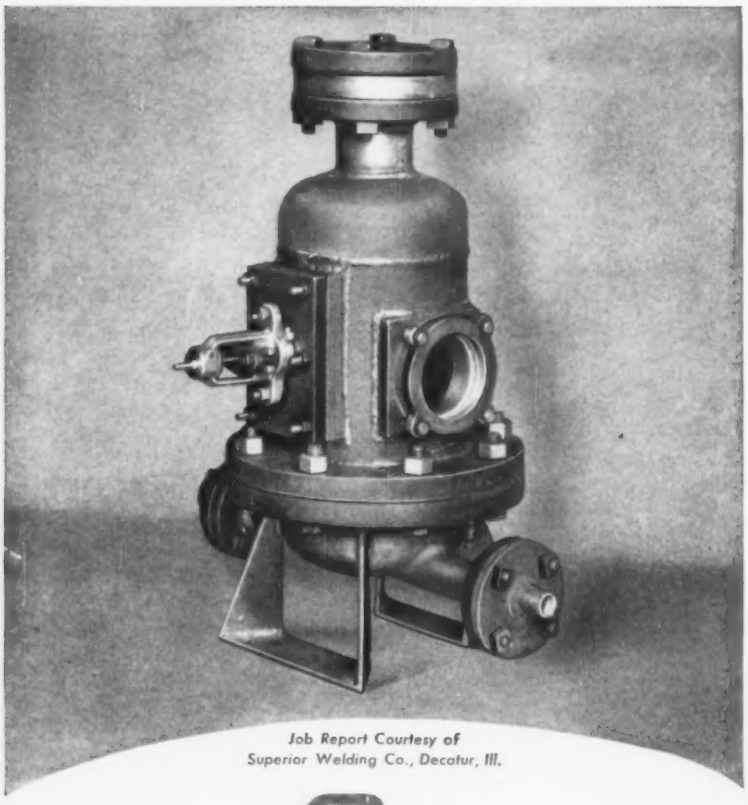


Job Report Courtesy of
Superior Welding Co., Decatur, Ill.

WELD WITH ARCOS

STAINLESS ELECTRODES

This sight flow box is used to check the condition and flow of process chemicals. To assure sound weldments when joining the carbon steel flanges (stainless faced) to the type 316 stainless unit, Arcos 25-20 Mo Electrodes were used. Because of the analysis and uniform ductility of this weld metal, it readily compensated for the unequal rates of contraction of the dissimilar metals. Arcos KMo Electrodes were used to complete the application. Whatever your job, your Arcos representative will have the answer with the right product and know-how. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

TECHNICAL BRIEFS

raises or lowers electrically; it can be tilted with respect to the torch truck.

Operates Easily — The operator works the torch from the control assembly. He adjusts torch height and travel speed and positions the torch to begin cutting at the required point. He turns it on and adjusts preheat gases, cutting oxygen, and Ferrojet powder (if used). He starts torch travel and stops it when the cut is finished; turns off all gases and powder; and retracts the machine.

The company uses the Ferrojet process for cutting stainless steels, alloy steels, and cast iron and skulls, thimbles and other scrap containing pockets of slag or refractory materials. The powder dispensing unit is adjacent to the cut-off machine. From here, a hose conveys the powder to the cutting torch. Its addition to the stream of cutting oxygen causes a fluxing action so that refractory oxides of alloying elements melt more easily. This permits the torch to cut the material with ease and speed.

Cutting results in volumes of iron-oxide smoke.

Very Portable—The torch adjusts through a vertical distance of almost 7 ft. The torch truck moves along the boom for a distance of 8½ ft.

There is no limit to the travel of the entire machine as this is limited only by the length of the

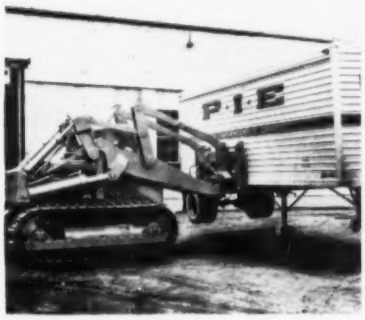
track that is desired. These movements in combination permit the company to machine-cut manually at considerably lower speeds.

The firm also has found the machine economical. Gas consumption, for example, for flame-cutting a 20-in. thickness runs to 200 cfh of natural gas, 400 cfh of preheat oxygen, and 2000 cfh of cutting oxygen.

Fork Lift Setup Lifts Big Load

Want to lift a 15,000-lb trailer 14 ft into the air? If so, there's a new fork lift unit that'll do just that. Of course, it also lifts other loads of comparable weight.

Mounted on a crawler tractor, the attachment features hydraulically-



Lift raises this 24-ft trailer with comparative ease.

operated four-way tilting and leveling. Its parent unit is a 143-hp tractor with a torque converter. The setup handles jobs on uneven or sloping ground as easily as in prepared storage areas. Its maker is Eimco Corp. of Salt Lake City.

Need Air? Rent It

Planning to increase your plant's compressed air capacity? If you are, it might be worthwhile to consider renting an air compressor.

Renting offers several advantages. According to L. B. Schramm of Schramm, Inc., West Chester, Pa., it gives extra capacity for short-term jobs or peak-load periods. It makes

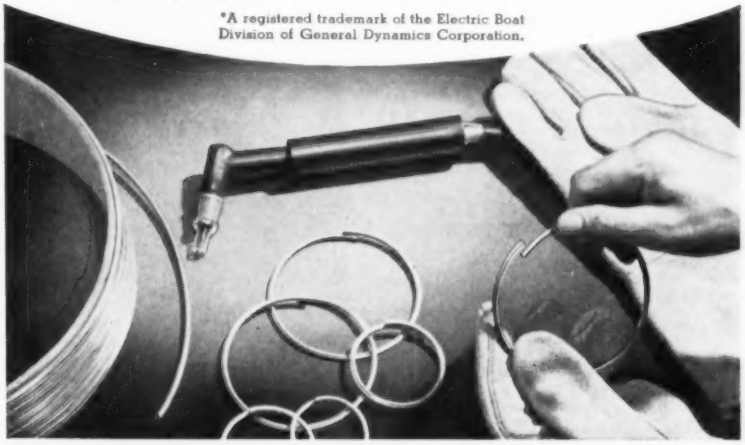
NEW PROCESS
assures improved pipe welds

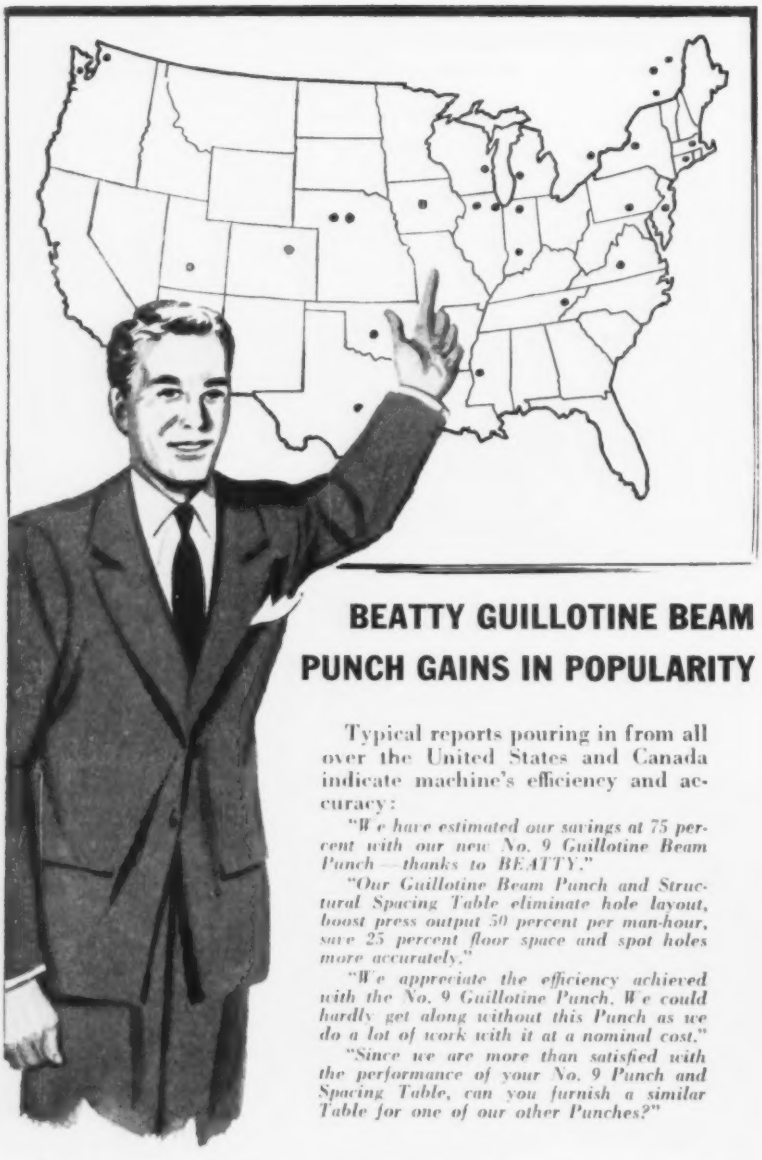
announcing the ARCOS

EB* WELD INSERT

To meet modern requirements for better pipe welds where high temperature, high pressure, and corrosive conditions exist, Arcos now offers the Consumable Weld Insert. Used for making the root pass, the EB Insert assures sound crevice free welds with smooth uniform inside contours. Saves money and time in fabrication . . . minimizes turbulence, and promotes trouble free service. Write for details. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

*A registered trademark of the Electric Boat Division of General Dynamics Corporation.





BEATTY GUILLOTINE BEAM PUNCH GAINS IN POPULARITY

Typical reports pouring in from all over the United States and Canada indicate machine's efficiency and accuracy:

"We have estimated our savings at 75 percent with our new No. 9 Guillotine Beam Punch — thanks to BEATTY."

"Our Guillotine Beam Punch and Structural Spacing Table eliminate hole layout, boost press output 50 percent per man-hour, save 25 percent floor space and spot holes more accurately."

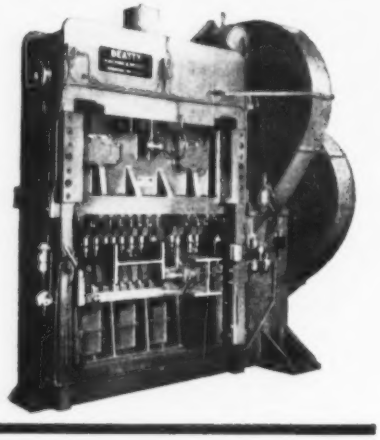
"We appreciate the efficiency achieved with the No. 9 Guillotine Punch. We could hardly get along without this Punch as we do a lot of work with it at a nominal cost."

"Since we are more than satisfied with the performance of your No. 9 Punch and Spacing Table, can you furnish a similar Table for one of our other Punches?"

PRODUCTION GIANT REQUIRES LESS FLOOR SPACE

Ideal machines for punching flanges and webs of beams, Beatty Guillotine Beam Punches require less floor space, offer lower first cost and extreme rigidity. Large die space, clear working space and two-point application of force to the ram affords full capacity loading and punching across the face of the ram.

200-ton Model 9, illustrated, for beams up to 30", punches all holes in web of 30" beam. 150 and 350 ton models also available.



Write For Full Details

BEATTY MACHINE & MFG. CO.

936 150th St., HAMMOND, IND.

equipment available without a large capital outlay, too. If your regular compressors are down for maintenance, rented compressors can come in handy for continuing operation.

One big asset seldom thought about is that renting gets a small, non-expert user some expert advice. It affords the user help in finding the right unit capacity and make for the job.

Three-in-one Rail Car Hauls Huge Loads

A railroad car in three parts, one part being the actual load the car is carrying, has been designed by Westinghouse Electric Corp. for transporting huge power transformers. The first of its kind, it is being built by Greenville Steel Car Co. of Greenville, Pa.

Transformer ratings and voltage classes are increasing at such a rapid rate that physical dimensions and

Designer holds model load which drops into middle of car.

weights have become a critical shipping problem. The car helps to overcome the problem.

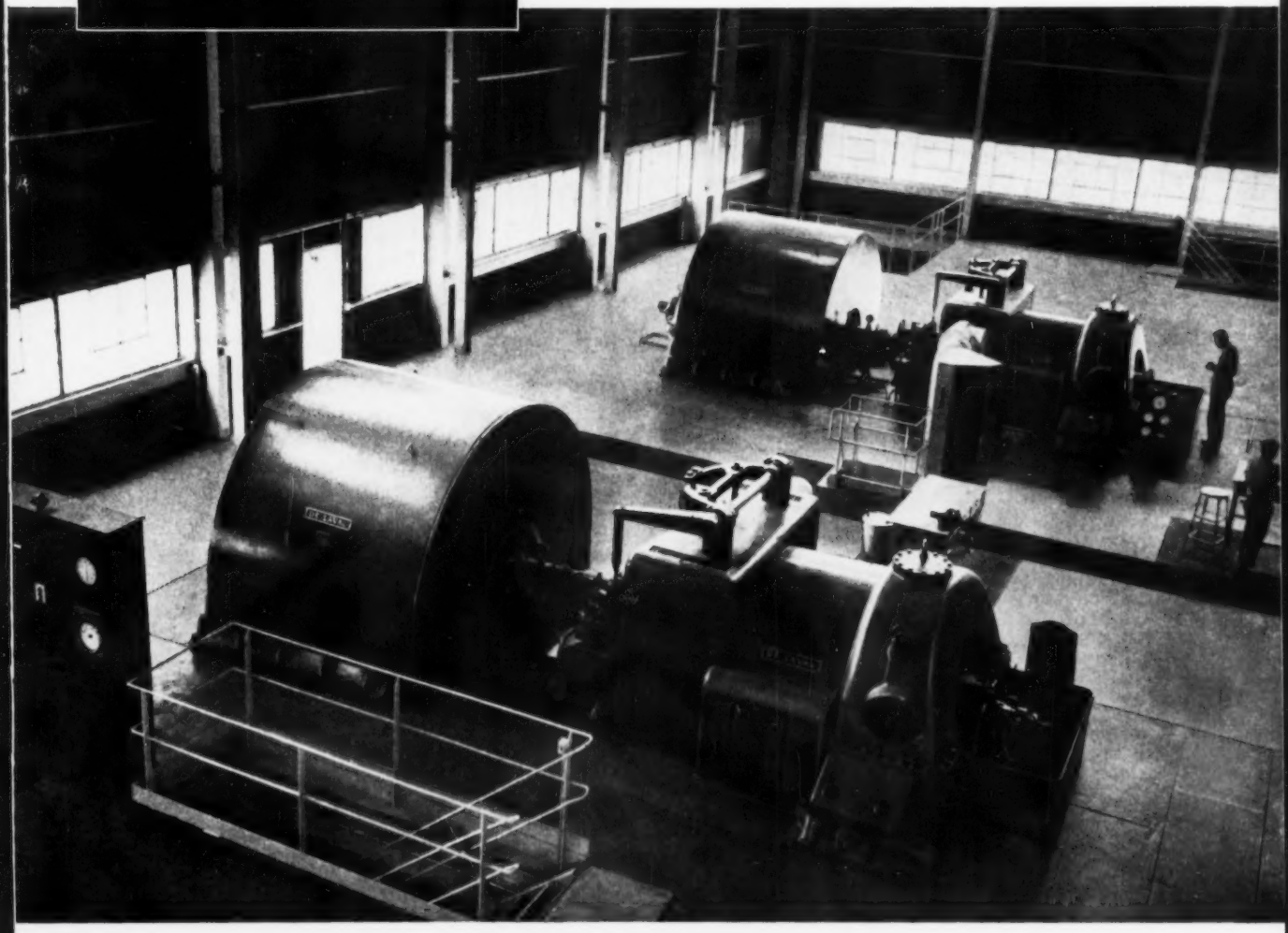
Hauls Big Loads—The unique car has a load capacity of 500,000 lb. It will transport a transformer 28 ft long and 12 ft wide.

The car is comprised of two identical sections; each is about 30 ft long. Each section consists basically of an underframe with trucks

DE LAVAL

BLAST FURNACE BLOWERS

deliver 110,000 cfm each for McLouth Steel



These two De Laval turbine-driven centrifugal blowers do a round-the-clock job in the McLouth Steel plant, Trenton, Michigan. Each has a rated capacity of 110,000 cfm of air; discharge pressure is 30 psig. Each is driven by a 12,400 hp, 2950 rpm De Laval steam turbine operating under steam conditions of 600 psig, 825 F with 2″ hg.

De Laval compressors are designed individually for each application to assure maximum efficiency and range of operation. Construction is rugged throughout. Casings and perfectly balanced rotors are built to take punishment. All parts are precision-made to limit gages. Materials are selected which will best meet the particular conditions of corrosion, pressure and temperature.

De Laval centrifugal blowers are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem.

Send for Bulletin 0504

DE LAVAL *Centrifugal Blowers*

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TECHNICAL BRIEFS

on which is mounted a steel truss. The transformer is suspended between the two trusses, forming the complete car.

The primary benefit of the new car is that the transformer can be lowered to within about six inches of the rails. A heavy-duty car used now for shipping the largest transformers has about 48-in. clearance between rail and car bed.

"By taking advantage of this extra clearance, we can now ship many very large units in one piece instead of splitting the top section," says a Westinghouse spokesman.

Taps First Heat

Colorado Fuel and Iron Corp. has completed a new open hearth furnace at its Pueblo, Colo., steel plant. With a capacity of 230 tons per heat, it is the largest furnace in the shop. Construction was carried on simultaneously with conversion of all furnaces in the shop to a double ladle heat practice. This permits tapping steel into two ladles rather than the one ladle used previously.

Casts Many Aluminum Shapes Rapidly

Nonferrous metals are continually cast in almost any shape at high speeds with a new method. Two years of actual production casting of aluminum and its alloys show that it also affords a high finish. On certain alloys, its developers say that the finish is "perfect."

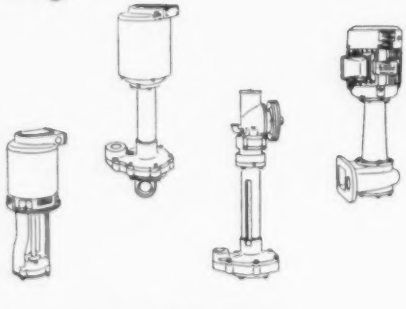
All types of aluminum alloys and some other nonferrous metals are suitable for casting by the process. Any standard shape can be cast, including round, square, hexagonal, flat, etc.

Uniform Grain — Using the method, grain size is accurately con-

Ruthman Gusher

COOLANT PUMPS

GIVE YOU LONGER LIFE



The sturdy, simple construction of Gusher Coolant Pumps with fewer parts, assures you of long trouble-free life. Heavy Duty pre-lubricated ball-bearings require no further attention. There is no priming necessary. You get coolant flow from the moment you turn on the machine. So for trouble-free coolant systems always specify Gusher Coolant Pumps.

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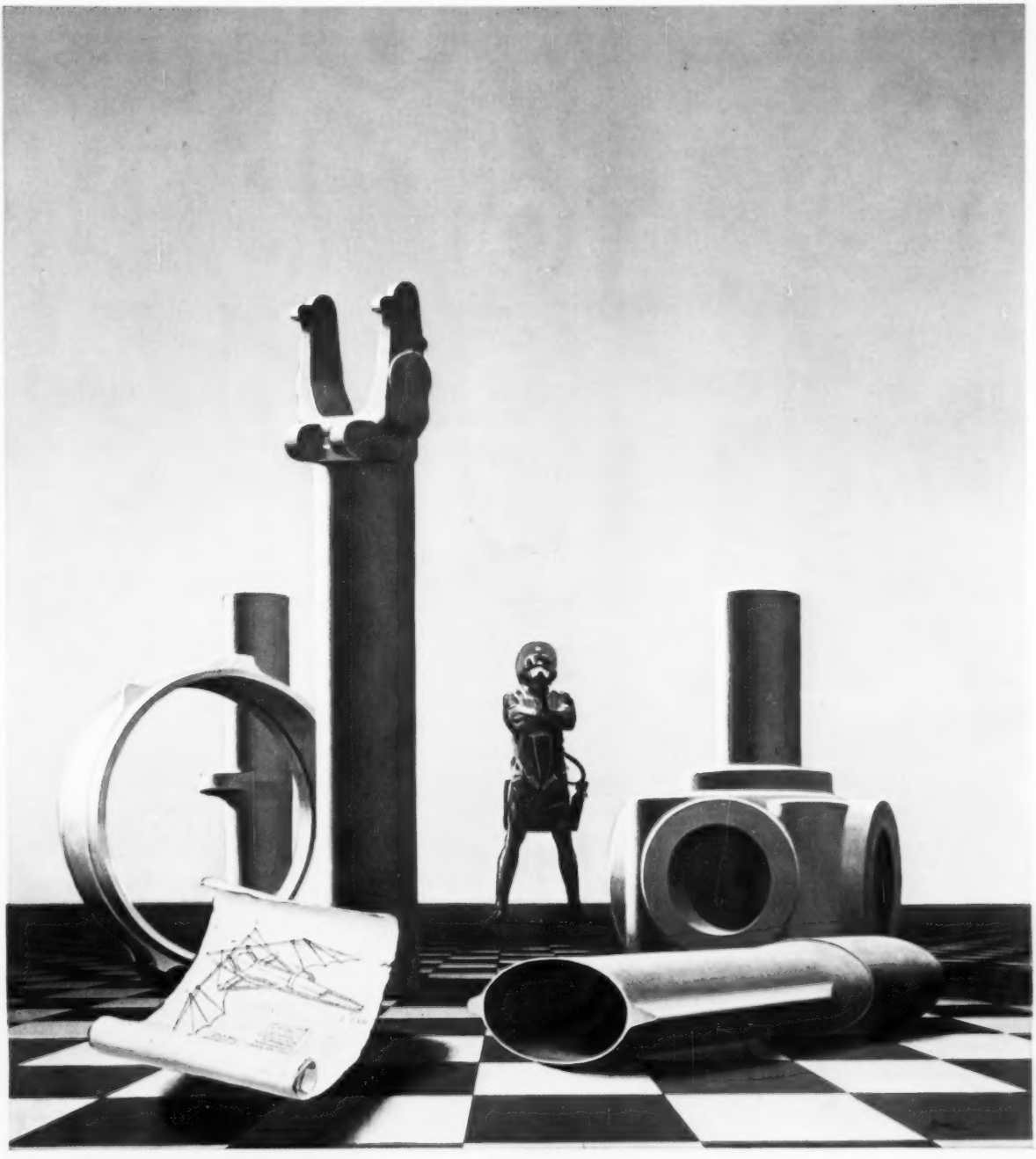

Sky Steel

Aircraft design today is a challenge unequalled in any period of the past. The exacting requirements to produce a superior result have pushed metallurgy and metal working beyond traditional practice.

The designer less often selects from standards but rather proposes new shapes and new materials to produce results beyond traditional thinking.

Cameron's contribution to this era has been the development of an unusual forging process for large, intricate ferrous components. Elimination of welds, better grain structure, internal as well as external curvatures, and considerable machining economy are making these remarkable "Sky Steel" forgings more popular every month. For complete information write or call . . .

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Standard "mirror-finished" cylinder tubing is full-finished to use without further sizing or finishing for such applications as *automobile shock absorbers, power steering* and *hydraulic pumps.* When it comes to punishment, it can really take it. Every inch of this rugged tubing measures up to exacting specifications in cylinder finish . . . in ID tolerances as close as .001" . . . in extreme uniformity of wall thickness and concentricity . . . in internal pressure resistance, *tested to shocks up to 9000 p.s.i.* Cylinder sizes to 3" OD x .165" wall. For full information on Standard's complete range of products, plant facilities and engineering assistance send for *free* folder below.

- **Welded Stainless Tubing and Pipe.**
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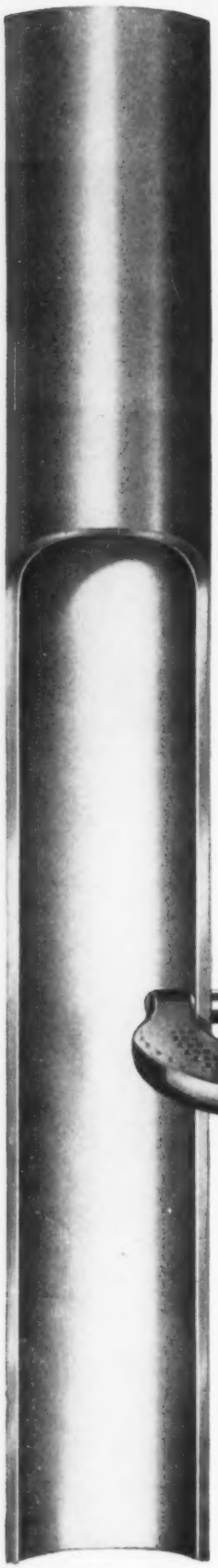

Shock absorber with metal-to-metal plunger in cylinder tube held to .001" ID tolerance. "Mirror-finish", concentricity and precision tolerance makes Standard cylinder-grade tubing usable *as is* for hydraulic and other cylinders.

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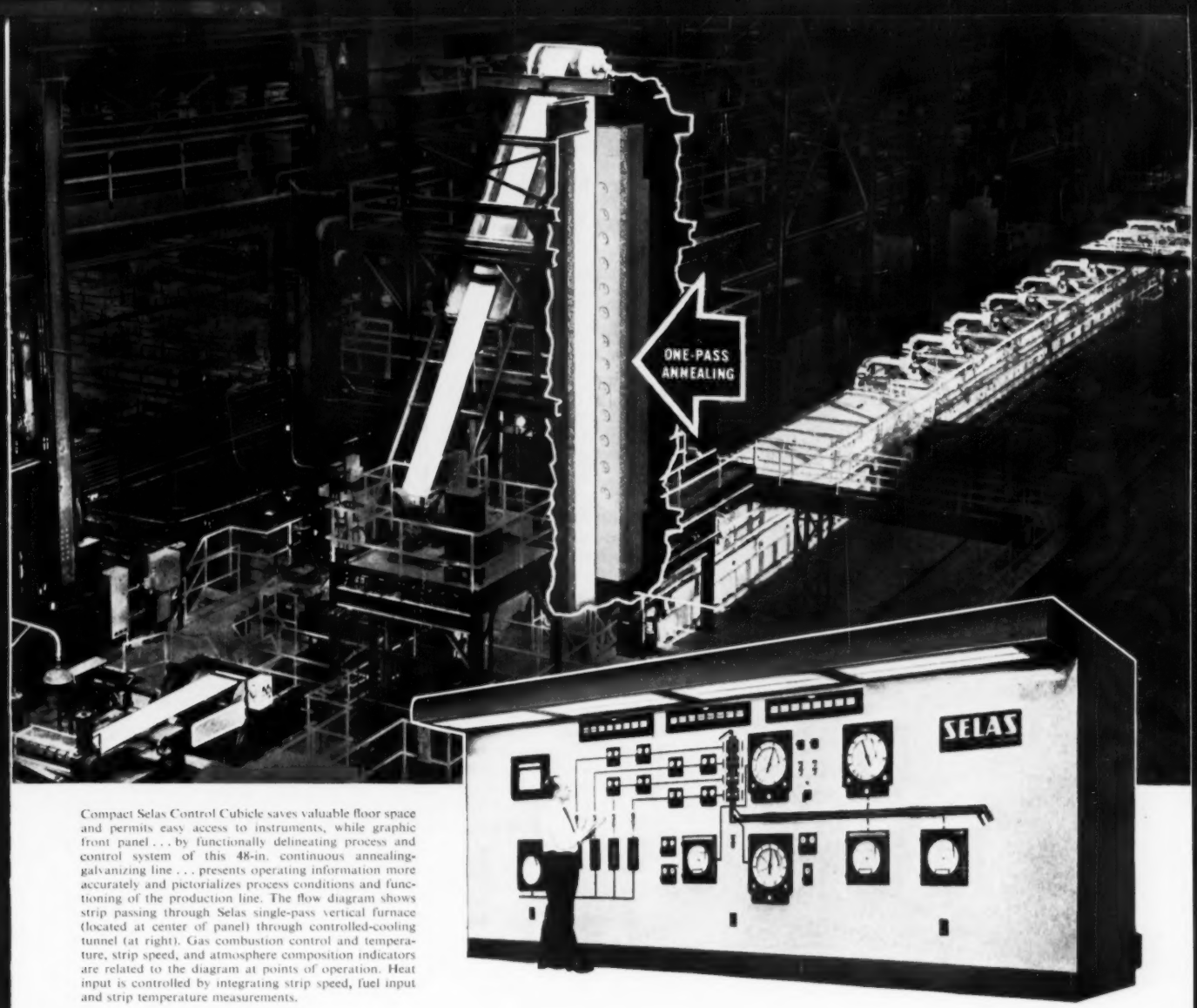
Welded stainless tubing and pipe • Welded carbon steel mechanical • Boiler and Heat Exchanger • Exclusive rigidized patterns • Special Shapes • Steel Tubing—Sizes: ½" OD to 5½" OD —.028 to .260 wall • Stainless—Sizes: ¼" OD to 4" OD—.020 to .154 wall.



Compact Selas Control Cubicle saves valuable floor space and permits easy access to instruments, while graphic front panel . . . by functionally delineating process and control system of this 48-in. continuous annealing-galvanizing line . . . presents operating information more accurately and pictorializes process conditions and functioning of the production line. The flow diagram shows strip passing through Selas single-pass vertical furnace (located at center of panel) through controlled-cooling tunnel (at right). Gas combustion control and temperature, strip speed, and atmosphere composition indicators are related to the diagram at points of operation. Heat input is controlled by integrating strip speed, fuel input and strip temperature measurements.

Controlled Strip Heating with Selas Gradiation® Processing

Steel strip is delivered continuously to the galvanizing bath, fully annealed and at temperature conditions best suited to the production of highest quality galvanized sheet . . . by the combination of Selas process control and Selas Gradiation heating.

The control cubicle, by visually relating the instrumentation to the processing flow diagram, simplifies process control and pictorializes functioning of the production line.

The Selas direct-fired heating principle is used in other continuous strip applications, including:

Bright annealing of steel . . . stainless steel annealing . . . tin reflow . . . galvanizing-annealing . . . preheat for galvanizing . . . preheat for annealing . . . bluing . . . special coatings . . . brass annealing.

In all these operations, radiant gas heat, precisely applied across the strip width, increases heating speed and produces unsurpassed uniformity in product quality.

- Compact single-vertical-pass design saves valuable floor space . . . avoids rolls in heated section, eliminating accompanying maintenance and product quality difficulties.
- Elimination of externally-prepared atmosphere in heating section reduces operating costs.
- Precise thermal control assures reproducible uniformity, regardless of gauge variations.

The same benefits are also being achieved in continuous annealing of nonferrous metals.

Our engineers will be glad to discuss how Selas Gradiation methods can be tailored to your strip heat-processing needs. Address Dept. 15.

SELAS
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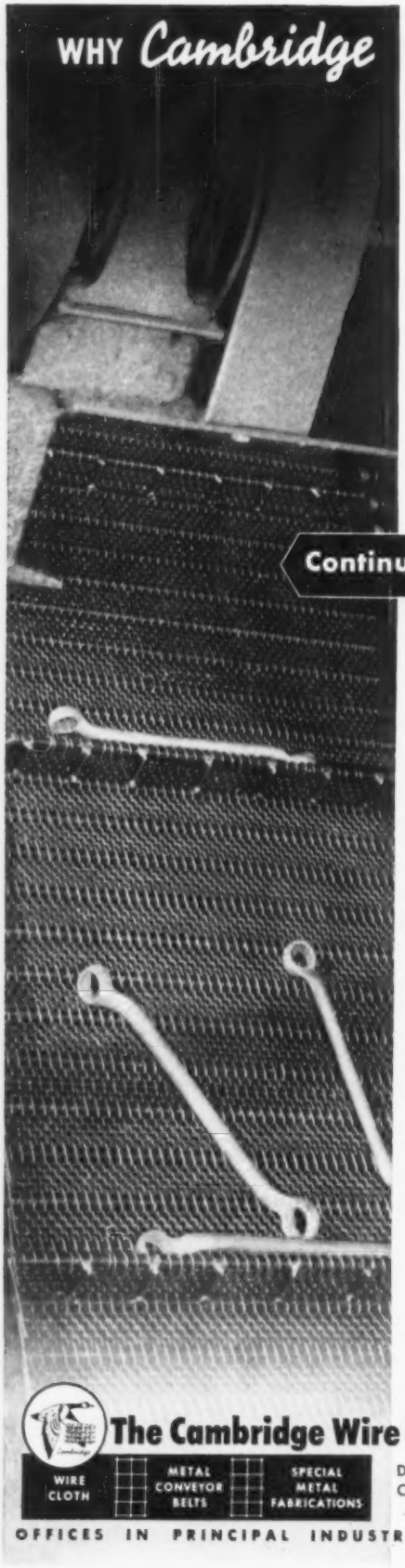
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers

DEVELOPMENT • DESIGN • CONSTRUCTION



WHY *Cambridge* **Woven Wire Belts**

mean low cost, continuous heat treating

Baskets and manual handling become things of the past, treatment is more uniform, capacity increases . . . *if* you eliminate batch operation and combine movement on woven wire conveyor belts with annealing, brazing, quenching, oiling, tempering, sintering. Your products move continuously in a belt-to-belt flow all through the heat treat cycle, process costs drop in all departments. FOR EXAMPLE:

Continuous Quenching

ALL-METAL BELT moves wrenches out of quench tank continuously, dumps and returns for more. Woven wire construction from corrosion-resistant alloy provides lasting strength . . . has no seams, lacers or fasteners to break or wear.

SPECIAL CROSS FLIGHTS pick up parts from tank, hold them on the belt during inclined travel.

OPEN MESH permits rapid drainage of quench solution, quick drying of parts—also provides free circulation of atmosphere in furnace cycles for more uniform annealing and brazing.

OPTIONAL CHAIN DRIVE provides positive motion for heavy loads or inclined movement. Friction drive easily handles most loads.

Cambridge Woven Wire Conveyor Belts are made in any size, mesh or weave, from any metal or alloy, and can be used under a wide range of conditions . . . hot or cold, wet or dry. Call your Cambridge Field Engineer to discuss how you can cut costs with continuous processing on woven wire conveyor belts. Look for his 'phone number under "Belting, Mechanical" in the Yellow Pages or write for FREE 130-PAGE REFERENCE MANUAL.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department A, Cambridge 4, Maryland

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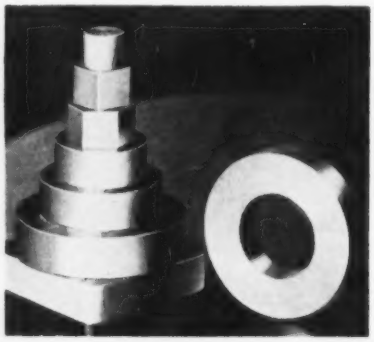
TECHNICAL BRIEFS

trolled. The grain is consistently uniform. In addition, small cross sections are cast with ease, according to Apex-Goss Div. of Apex Smelting Co., Cleveland.

Aluminum-tin bearing alloys are successfully cast by the process. Ternalloy (aluminum-zinc-magnesium) produced is free-machining and requires no heat treatment. Deoxidizing rod continuously cast



The process allows casting of many shapes and sizes.

gives very good efficiency with close control of residual aluminum in making fully killed steel, some steel users report.

Because of the controlled, uniform grain size, extruders say low pressures can be used to extrude metal cast by the method. The material's uniform density results in clean machining characteristics of the medium grain, free machining grade cast by the process. Most advantages seen testing aluminum will hold true for other nonferrous metals, its developers believe.

Speeds Burr Making

The Atrax Co., Newington, Conn., now produce complete standard carbide burrs automatically. Automatic burr grinders turn out the precision burrs at high speeds The grinders, actuated by cams, automatically grind carbide blanks to size, shape and with the specified number of flutes.

Wet grinding with a diamond wheel under water coolant permits

each flute to be ground from the solid in one pass. This controlled fluting produces uniform cutting edges. It eliminates the trial and error of semiautomatic two, three, or four pass grinding which harassed the company in the past. Machining time in many instances has been reduced by more than 75-pct, the firm reports. The grinders were designed, developed and built by Atrax. They aren't for sale.

Scrubbers Halt Smoke, Dust, Dirt Emission

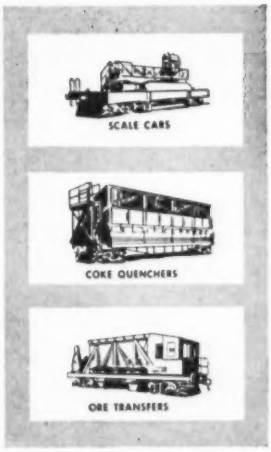
Installing smoke-breakers solves air-pollution worries for one firm. Since putting three units into a trio of lime kilns, the company has virtually eliminated dust emission.

"By their very nature," admits Electro Metallurgical Co., "ferroalloy and calcium carbide plants present problems in air pollution. The types of furnaces and operations involved, the materials handled and the size of the operation are all contributing factors, and these plants were originally built in isolated areas."

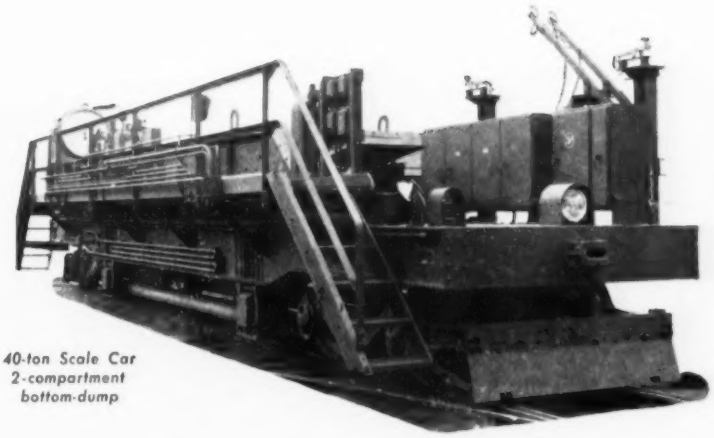
Difficult To See—The kilns, located at Niagara Falls, belched smoke, dust, fumes and gases. As residential housing moved closer and closer, the problem became more acute. "It was difficult for the average person to understand," explains the firm, "that science has not yet discovered any 100-pct effective control methods, and that some operations were difficult if not impossible to control at all."

From the very beginning, Electromet realized that most of the dust came from the calcining of lime hydrate in rotary kilns. Willing to cooperate to curb the dust emission, the firm started to construct vertical lime kilns to replace the rotary ones. It was hoped these could be controlled closer.

Installs Scrubber—Then Electromet resumed work on the rotary kiln. Into it went a Pease-Anthony scrubber. Cost: $100,000. This proved very satisfactory. The scrubber showed efficiencies over 98-pct



why is ATLAS preferred?



40-ton Scale Car
2-compartment
bottom-dump

The dependability of Atlas cars is such that a number of blast furnaces are operating their Atlas scale cars without a spare car.

THE ATLAS CAR & MFG. CO.

Since 1896

1100 Ivanhoe Rd. • Cleveland 10, Ohio

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Through the use of a THERMAL High Velocity burner production for a given size furnace can be substantially increased or furnace size for a given rate or production can be decreased.

high velocity burners by THERMAL

(1) Combustion 90% completed within the burner itself.

(2) Convection is a predominant means of heat transfer.

(3) High exit velocities (300 to 500 ft/sec) of products of combustion.

(4) Identical flame characteristics with oil, gas or combination gas-oil burner.

(5) Heat release rates of 10,000,000 BTU/hr/cu ft of combustion space.

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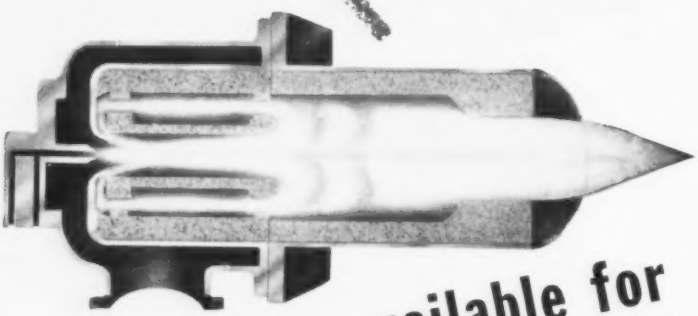

NOW... available for residual oil!

■ By proper utilization of the THERMAL burner characteristics of high velocity, high temperature, non-luminous flame, remarkable results have been obtained in furnaces, kilns, ovens and heat exchange equipment of all types. Let us analyze the effects possible in your facilities or describe the specialized heat equipment designed and built by THERMAL. Write for Bulletin No. 108.

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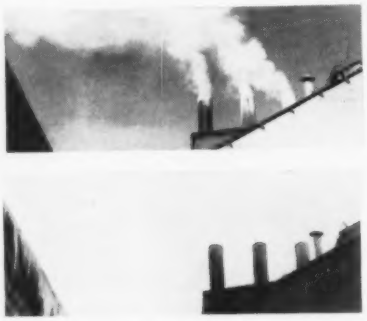
The scrubbers, 12-ft diam and 33-ft high, have 22 sets of water spray nozzles. Dust laden gases from the kilns pass up through the



Heavy smoke (top) disappears when scrubbers go on.

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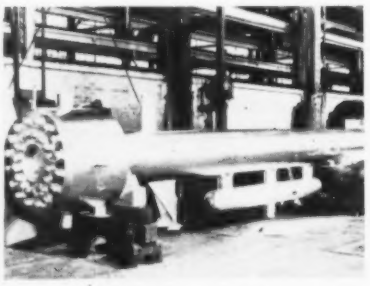
The sole purpose of the scrubber is to keep dust out of the atmosphere. There is no sludge recovery. Consequently, there is no dollar value realized on the investment.

Tests Atom Powerplant

A special temperature bleeder heater has been designed and fabricated to be part of a high pressure



This breeder heater will test the nuclear station.

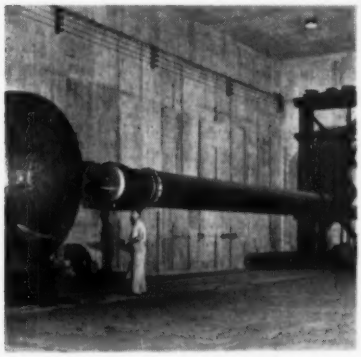
test loop to test the relief valves for the nation's first full scale atomic-electric plant at Shippingport, Pa.

The pressurized water reactor de-

signed by Westinghouse Electric Corp. for this installation will employ relief valves operating at extremely high pressures. Rigid tests will be made on these valves before installation. To test these, Griscom-Russell Co., Massillon, Ohio, built a heater capable of operating at pressures and temperatures on the shell side higher than any yet specified for feedwater heaters.

X-ray Checks Vessels

A 1,000,000-volt X-ray machine just put in use by Chicago Bridge & Iron Co., inspects pressure vessel heads fabricated by the firm. The company also uses the equipment for non-destructive inspection of



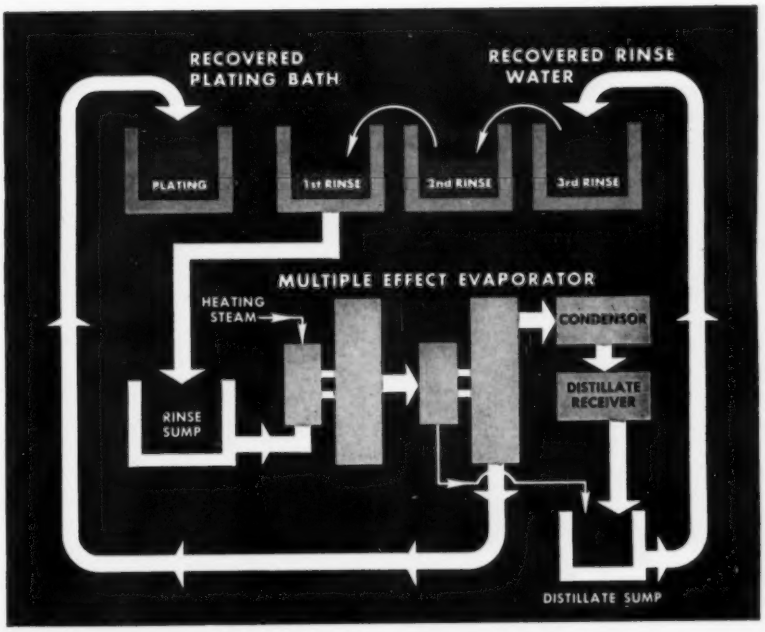
X-ray unit checks a pressure vessel head (foreground).

welded shell seams in heavy wall pressure vessels. Mounted on rails, the instrument is fixed on the end of a 43-ft long counter-weighted boom. An extra-thick concrete structure houses the installation, which is located at the company's Birmingham plant.

Plastic Goes On Metal

Nylon and polyethylene now can be mass-coated to metals. Beginning next month, a major plastics firm plans to begin large-scale coating of metals with these and other materials.

Employing a new technique, the Polymer Corp. of Reading, Pa. is opening a plant in Santa Ana, Calif. for doing the coating. Known as the Whirlclad process, it involves dip-



New recovery system cuts plating costs!

Industrial's Plating Bath Recovery Equipment provides complete recovery of acid and metal dragout losses, using a rapid evaporation process engineered to suit your operation. The savings can be fantastic . . . the system not only returns fresh plating solution to the bath and pure water to rinse tanks . . . it eliminates the high cost and trouble of neutralizing corrosive rinse water for disposal.

Here is a typical example of what Industrial engineers can do:

Saves $925.00 per week. A company plates metal parts with a copper-tin-lead alloy, using a series of plating machines with a total bath drag-out of 16.65 gallons per hour. Replacement of solutions and destruction of rinse water (to avoid damage to sewage systems and to meet anti-pollution requirements) costs $12.46 per hour. **Recovery with an Industrial unit costs $2.13 per hour.** The equipment pays for itself in 164 working days.

Unbelievable? . . . No sir! . . . these are systems designed by a company with a 30-year reputation for building the best in plating equipment. Let us prove it—our staff will be glad to make an analysis of your process, recommend equipment and estimate costs and savings.

Send for complete data

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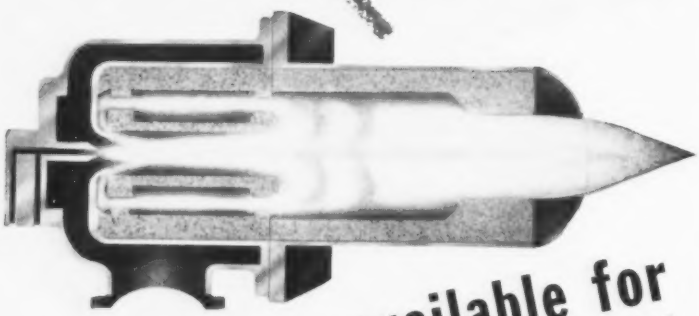

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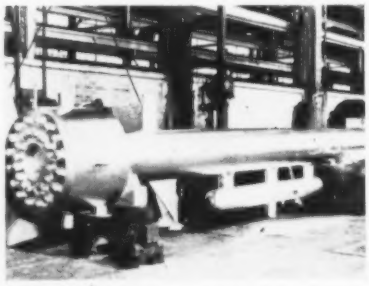

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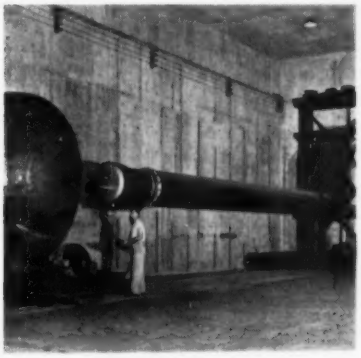

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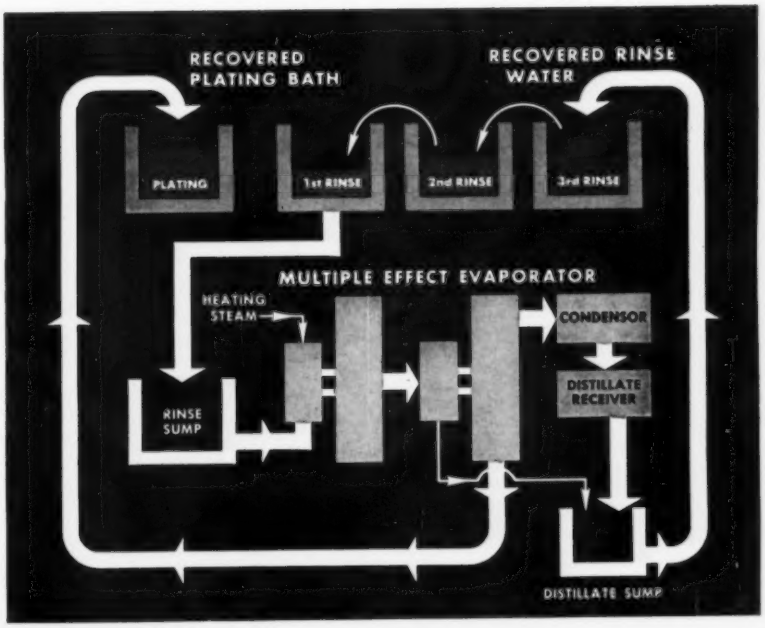

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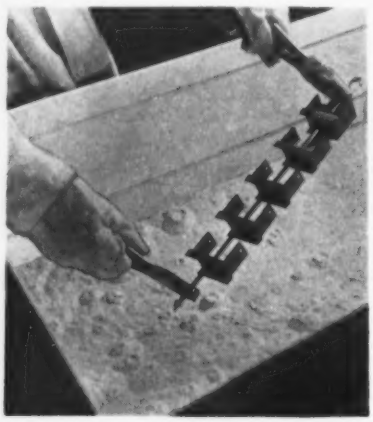
TECHNICAL BRIEFS

ping preheated articles into a bed of finely divided dry powders. These are fluidized by ascending currents of gas or air. The powders heat fuse to form the coating.

Wide Range—The process is based on inventions of Knapsack-Griesheim Div. of Farbwerke-Hoechst in Germany. The fluidized bed technique permits use of a wide range of plastic materials. Nylon, polyethylene, cellulosics, epoxies and polyethers can be applied to metals and other base materials. The single dip technique applies coatings for chemical and corrosion resistance, wear resistance, electrical insulation and decorative purposes.



Finisher dips preheated parts into the coating powders.

Teflon Tapes Now To 3/16-in. Size

Based on a new fabricating method, Teflon continuous-roll tapes in thicknesses to 3/16 in. have been developed. Previously, Teflon tapes were available only up to 1/16 in. thickness, and in sheets with maximum lengths of four feet. Development of the new heavy Teflon tapes by the Enflo Corp., Pennsauken, N. J., means that lengths from forty to several hundred feet are available in thicknesses of 3/32, 1/8, 5/32, and 3/16 in. Maximum width varies from 6 to 12 in. depending on thickness.

The new heavy tapes are available in virgin Teflon, TFMC (mechanical-chemical) and Enflon (filled Teflon). Or they can be had in cementable or pressure-sensitive types.

Weld Methods Improve

Building offshore oil drilling platforms offers many problems. Pounding waves and salt water corrosion present special headaches in their construction. Reinforcement of key areas is essential. Weld quality is important.

Dupont Fabricators, Inc., Morgan City, La., a pioneer builder of these structures, figures that it saved hundreds of man-hours and increased weld quality by using manual Heliarc argon-shielded and mechanized Unionmelt welding to replace former methods.

Corrodes Quickly—Rapid corrosion of the steel legs at the splash zone, the area where waves hit the legs, was a major problem. Sheet

of 20 ga. Monel alloy or copper now provide additional protection for the carbon steel pipe. Longitudinal butt welds and circumferential fillet welds of these wrappings are made by manual Heliarc argon-shielded welding. This builder selected this welding process because it is fast and post-weld cleaning is eliminated.

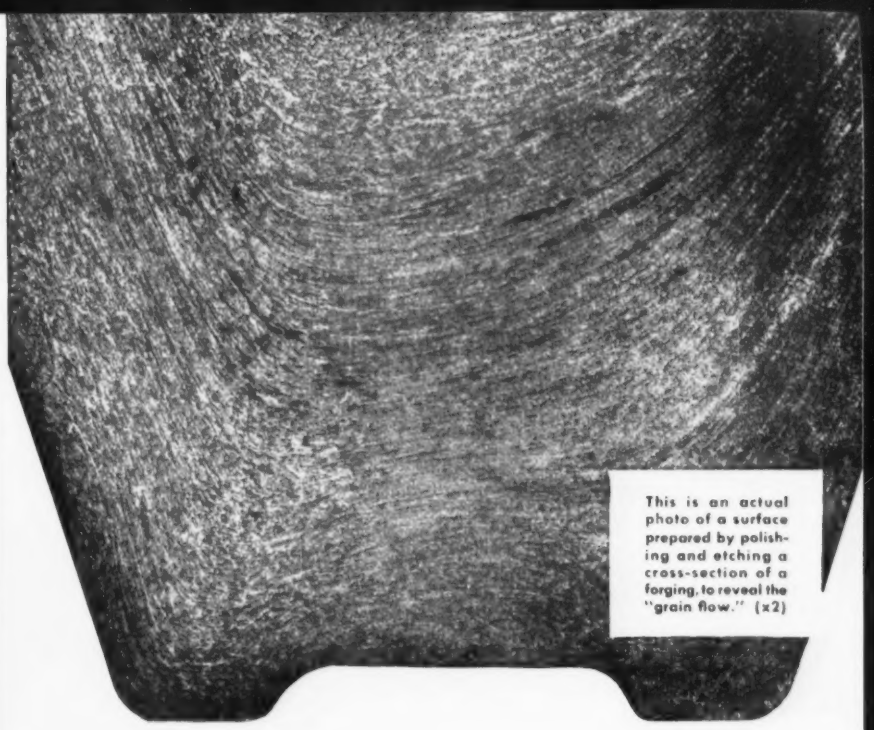
Man-hour savings in welding of doubler plates to the main structure legs is made possible by mechanized Unionmelt welding. These plates reinforce the legs at points where horizontal and diagonal braces meet. It takes one operator one day to complete a job now which previously required five men.

Two mechanized heads weld doubler plates to platform legs.

Several hundred man-hours also were saved by mechanized Unionmelt welding of multiple joints in piling.

Welds Nuclear Vessel

Welding of a new fast breeder atomic reactor vessel is aided by a specially designed welding positioner at Combustion Engineering, Inc., Chattanooga, Tenn. The positioner uses electronic variable speed tilt and rotation. This lets the weldments be welded automatically about two planes of motion. Made by Worthington Corp., Harrison, N. J., the 50-ton positioner holds weldments in almost any desired position.


This is an actual photo of a surface prepared by polishing and etching a cross-section of a forging, to reveal the "grain flow." (x2)

A PICTURE OF ADVANTAGES YOU CAN GET ONLY FROM FORGINGS

In the picture above you see the grain flow in a forging.

This picture demonstrates two things. First, the metal is dense and free from porosity. The impact or pressure of forging helps make it so. Such density is important when parts must have machined surfaces, when they must provide reliable strength and safety, and when they must be tight against leakage of liquids or gases. This quality reduces rejects and saves money. It contributes to safety and saves lives.

Second, notice how grain flow lines follow the shape of the part. This improves impact resistance and fatigue strength of the part. In closed-die forging, these flow lines can be positioned, to give maximum properties where they are needed. As a result, forged parts can be lighter, safer, stronger, and frequently less costly.

Thus this picture shows you why forged metal is *metal you can trust.* You can trust forgings for performance, and to save money. Find out how forgings can improve your products, your costs. Consult a *Forging Engineer*, and send for the booklets offered below.

closed-die **forgings** for metal you can trust

DROP FORGING ASSOCIATION, DEPT. IA

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Symbolic emblem of the Drop Forging Association

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This booklet covers the scope of CONTINENTAL Service. It is well illustrated with views of CONTINENTAL installations with descriptions of the equipment and the processes performed.

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TECHNICAL BRIEFS

Line Turns Strip Into Tube Automatically

On a new production line, a coil of steel strip converts into galvanized electrical metallic tubing automatically. Though meeting exacting standards for straightness and roundness, the tubing is literally "untouched by human hand" from start to finish.

In use at Columbia Cable & Electric Co., Brooklyn, the line includes an electric-weld tube mill, shear, annealing furnace and quench tank and a continuous galvanizing

Operator pumps lubricant to roll bearings on the straightener.

line. A key feature is a new rotary tube straightener built by E. W. Bliss Co.'s Mackintosh-Hemphill Div., Canton, Ohio.

Flexes Tube—The straightening operation follows annealing. It straightens and rounds the tubing by flexing it between three pairs of power-driven cross rolls. The 10-ft lengths, in diameters from nominal ½ to 2 in., pass through the straightener at 335-fpm speeds.

Radial Units Rapidly Drill Router Jigs

Positioning holes for router jigs of various sizes and shapes with varying number of holes are made at a production-line pace in a setup at North American Aviation's Columbus, Ohio, plant. Two Walker-

Turner radial drills bring the drill or other tool to any spot on the work and position it accurately without a workholding device.

The operator of the first radial press drills holes through a pattern which is positioned over the router jig by means of two pins on the jig. Router jigs are made up of an aluminum sheet cut to shape and backed up with ¾-inch plywood.

Pilot Guides Drill—Holes in the patterns are ¼-in. in diameter. A special pilot attachment guides the drill into the pattern holes. It consists of a "spring cage," made up of two collars connected by bolts and springs. This holds a hollow locating pin through which the drill works. Locating pins are replaceable so that the entire pilot attachment need not be replaced when the pin wears.

After the first operator has finished drilling holes in a jig, he passes the work to the second machine. The operator of the second machine drills or countersinks the holes as necessary.

Heads of the radial drills can be extended 36 in. This permits drilling in very large router jigs.

Cuts Working Time

Sometimes, it makes a difference whether a hole gets drilled last or first. A manufacturer machining tractor parts on an experimental basis finds that drilling a hole at the end of an operation saves considerable time.

The part is made using a Starbore drill with a Carmet CA-4 carbide tip. The hole is 0.430-in. in diameter, 4¼-in. long in a cast iron valve stem bushing. It is made in 4¼-seconds. The hole is held to a 0.0005-in. tolerance and a 0.002-in. concentricity tolerance.

Sulphur-based oil is the coolant. Surface finish of the hole, honed later, is 50 microinch, rms. Drill speed is 3000 rpm., coolant pressure 250-psi.

Allegheny Ludlum Steel Corp., Pittsburgh, produces Carmet cemented carbides. Star Cutter Co. Farmington, Mich., makes the drill.

(Advertisement)

Udylite Builds Largest Plating Installation On West Coast

Rheem Automotive Company greatly increases production capacity for automobile bumpers in completely new plant.

IN an orange grove setting, near Fullerton, California, Rheem Automotive Company now has in operation the largest plating installation on the West Coast. It was designed and built by the Udylite Corporation under the supervision of the L. H. Butcher Company Division. Udylite furnished a complete "package" for the cleaning and plating facility.

Rheem manufactures the complete bumper right from panels of high tensile steel. Before plating, these panels are pickled, polished, bonderized, rinsed, formed and then transferred by an overhead monorail system to the plating department. Here in an area the size of a football field the bumpers travel through thirty-one operations.

Upon arrival at the plating department, ten to sixteen bumpers are placed on each rack in a floor level racking area. The racks, mounted on work carriers, are delivered automatically to the Udylite pre-plate unit by the monorail system. This automatic machine is 133′ long x 15′ wide x 22′ high. It operates hydraulically and routes the work through a pre-plate cycle including cleaning, spraying, acid dip and nickel strike.

After the cleaning and surface preparation, the work carriers with their racks of bumpers are delivered selectively to either of the two nickel plating lines where they are then placed in the nickel plating tanks on a predetermined time cycle.

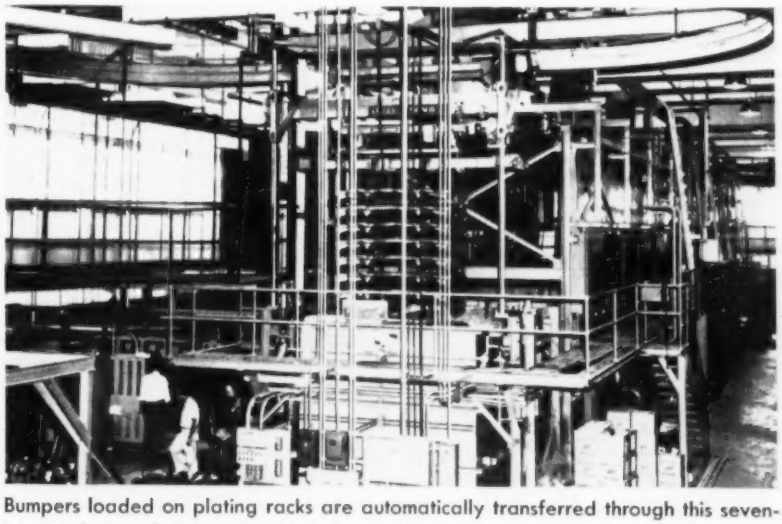
The nickel line consists of two sections, each composed of sixteen tanks; twelve contain nickel plating solutions. Each nickel plating tank has conforming anodes and cathode bar agitation and contains 3,750 gallons of solution which is continuously filtered and heated by heat exchangers. Each tank is powered by a 5,000 ampere, 18 volt Udylite-General Electric Germanium rectifier with automatic stabilized voltage control.

Work carriers are picked up at the end of the nickel line and are transferred to inspection stations by means of the continuous monorail system, prior to final chromium plating.

After inspection, work carriers are automatically delivered to the chromium plating line and handled by a manually operated monorail system through a series of ten cleaning, rinsing and chromium plating tanks.

Then, after chromium plating, the work carriers are automatically picked up and delivered to an unloading area where the plated bumpers are removed for inspection and palletizing.

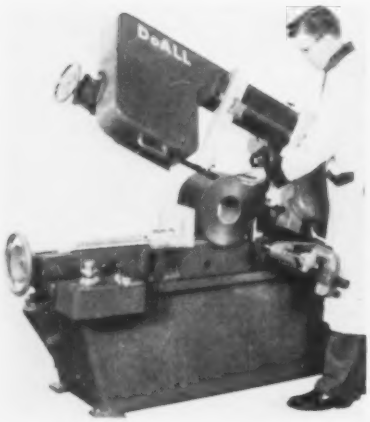
The new Rheem facilities are said to greatly increase plating capacity for automobile bumpers.



Bumpers loaded on plating racks are automatically transferred through this seventeen tank pre-plating unit giving chemically clean surfaces prior to nickel plating.

New Production Ideas

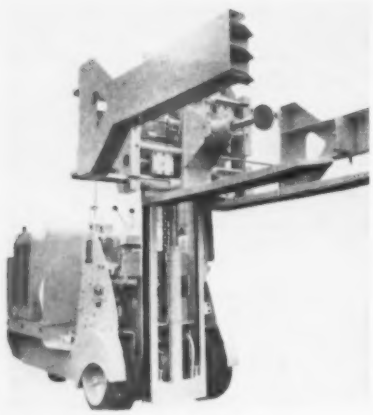
Equipment, Methods and Services



Power Saw Cures Maintenance Shop Headaches

Suffering from maintenance shop delays, bottlenecks or headaches? This power saw could be a cure for them. It is a rugged, heavy duty machine using high-speed steel blades. Not primarily for production use, it embodies features desired for maintenance and rebuilding shops and similar users. Its operation is nearly foolproof so that unskilled workers can use it. Setup is easy and quick; it also cuts fast. The unit handles 12-in. rounds, 12 x 12-in. square stock and work weighing to 1500 lb. It is common practice in many maintenance shops for unskilled workers to use the saw. Since they usually pay little attention to cutting speeds, the model has four speeds by means of step pulleys. One can be selected for principal work, leaving the others for more critical jobs. It has a built-in coolant system. (The DoALL Co.)

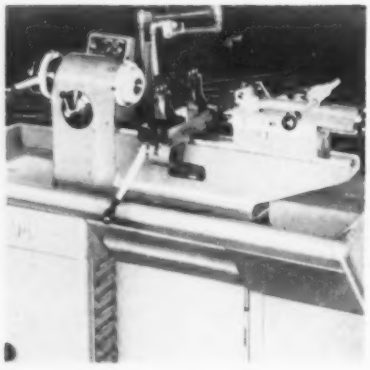
For more data circle No. 40 on postcard, p. 129



Fork Attachment Aids Bearing Chock Removal

Industrial fork trucks can now easily remove work roll bearing chocks in steel rolling mills. Thanks to a new attachment, one maker's fork lifts do this quickly and simply. The device enables one man to remove the bearing chocks. He merely runs the truck up to the chock, which usually weighs from 3200 to 4000 lb. The operator takes the chock's weight off the roll neck with the truck's forks; at the same time, he clamps on gripping arms. A hydraulic pushing ram then pushes against the roll neck; this pulls the bearing chock free from the roll. Fork spread hydraulically adjusts to remove the coupling. Push-pull shoes on the gripping arms easily set at any of 14 positions to suit the bearing's size. After removal and subsequent grinding of the worn roll on a lathe, the chocks are serviced. The truck then reinstalls them. (Automatic Transportation Co.)

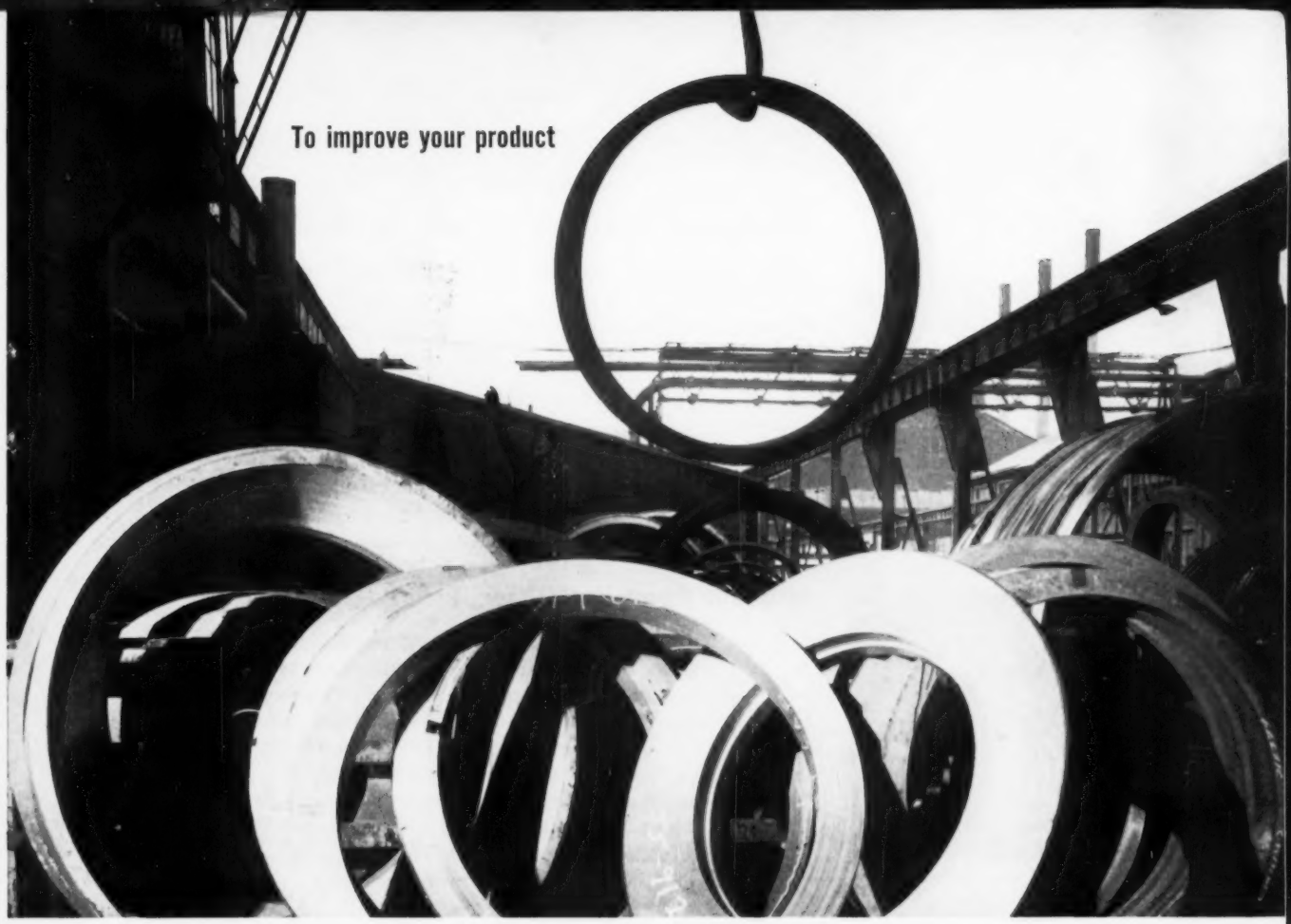
For more data circle No. 41 on postcard, p. 129



Turret Lathe Has Infinitely Variable Speeds

This hand turret lathe uses variable speeds in conjunction with electric clutches for speed changing and reversing functions. Its push-button operation of a servomechanism provides a range of infinite spindle speeds with 140 to 3500 rpm. The lathe's standard constant speed motor powers this entire speed range without reversals or speed changes by the motor itself. This prevents motor heat build-up and wasted power. The electric clutches offer an immediate high-to-low spindle speed ratio of 5 to 1. They also provide unlimited spindle reversal. The self-centering bed is flame-hardened and ground. It is of heavy, rigid construction. Bed design also allows easy chip removal. (Wade Tool Co.)

For more data circle No. 42 on postcard, p. 129



ALCO CIRCULAR FORGINGS BRING HIGH QUALITY, UNIFORMITY

Proved steelmaking and forging techniques, new facilities at ALCO build quality and uniformity into circular forgings for savings to you; forged rings also available in new Hi-Qua-Led Steel ®

Experience for over 80 years has developed ALCO's steelmaking and forging techniques for the production of high-quality circular forgings. This, coupled with new ALCO facilities such as an automatically controlled preheat furnace, modernized forging press and rolling mills, means unfailing uniformity of any order to your precise specifications — saving you money in machining and extending the service of your product.

For further advantage in machinability, ALCO also offers its circular forgings in Hi-Qua-Led Steel, a significant new development that drastically reduces machining time and tool wear without any change of basic steel properties. Hi-Qua-Led is available in all AISI open-hearth grades.

If your order is Hi-Qua-Led, ALCO metallurgists and machining technicians will be available for your trial machining runs to help you get the full benefits from this new steel.

ALCO circular forgings are available from 18- to 145-in. OD. You can get complete information from the nearest ALCO sales office, or write Spring & Forge Division, Dept. OCF-2, P.O. Box 1065, Schenectady 1, N. Y. for brochures.

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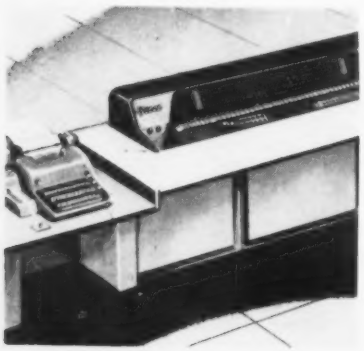
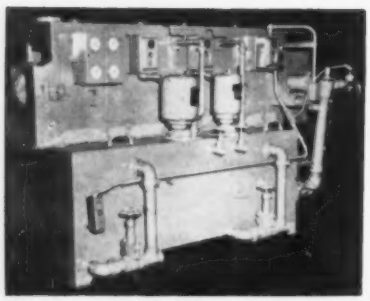


Computer Uses Transistors, Printed Circuits

Completely transistorized, this electronic data processing unit performs on-line and off-line commercial, scientific and military jobs. The computer makes extensive use of printed circuitry. Combined with the transistors, this gives the equipment compactness, light weight, and low power consumption. Unlike vacuum tubes, the transistors need no periodic replacement. Generating comparatively little heat, the unit requires only a small air conditioning setup. In fact, only the amount of cooling needed for human comfort is sufficient. Ready to operate on-delivery, the computer portion of the system entails no installation work on special wiring; it plugs right into existing 110-v, 60-cycle outlets. (Philco Corp.)

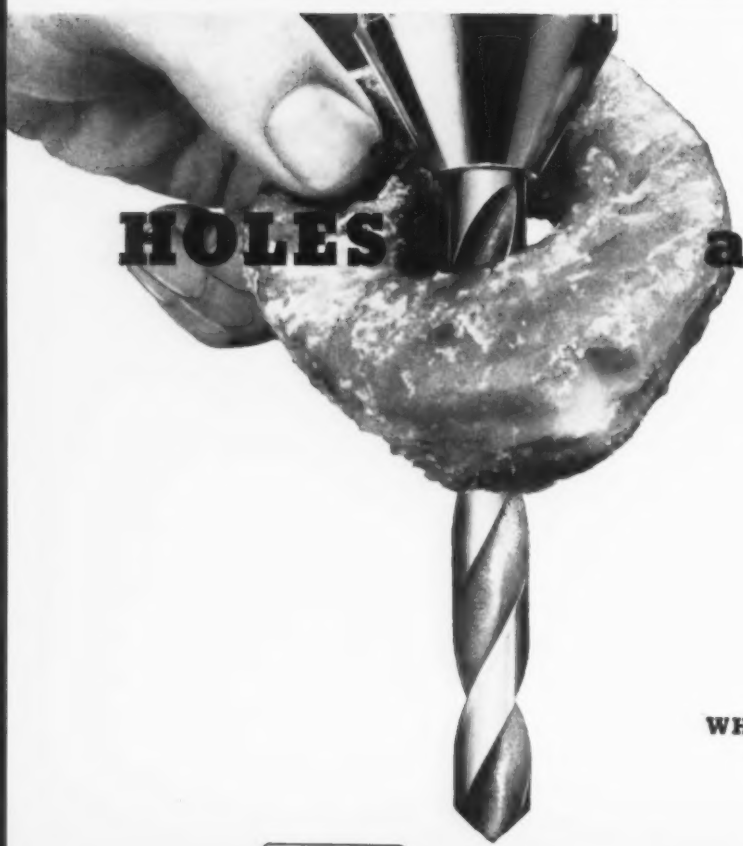
For more data circle No. 43 on postcard, p. 129



Washer Removes Chips, Filings, Oil, Grease

Chips, filings, oil and grease are removed from work parts delivered to this washing machine by conveyors from screw machines. It employs a metal mesh conveyor to carry the work parts through powerful sprays of heated detergent solution followed by a hot rinsing spray. The cleaned parts are then discharged from the delivery end of the machine ready for the next operation. The machine measures 6 x 3 x 4 ft and processes parts up to 6 x 3-in. The unit can connect to turret lathes and other machining setups by multiple collecting floor conveyors. (Industrial Systems Co.)

For more data circle No. 44 on postcard, p. 129



HOLES are nothing at

A hole in steel is a "nothing-at-all" with engineered sides. And many costly things can happen to it: drilling, broaching, reaming, tapping, counterboring, countersinking, and so on. What's more, holes weaken the product, necessitate extra bosses, cause possible leaks, create corrosion pockets.

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NELSON® stud welding eliminates at least

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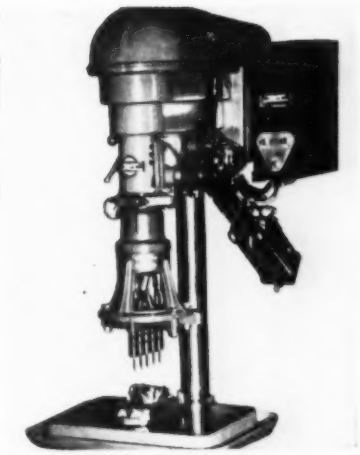
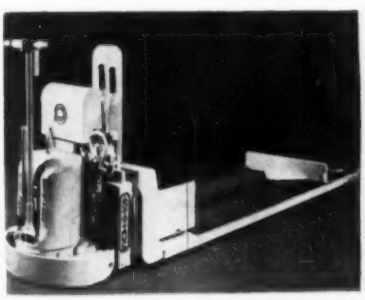
Tapper-driller Taps Single, Multiple Jobs



Featuring a wide speed range, this combination tapping-drilling machine handles single or multiple spindle operations. A switch controls its alternation between tap and drill positions for either right or left hand operation. Its air controlled spindle feed allows complete automatic or semi-automatic cycling, plus thread chasing. A checking action on the reversal prevents pulling the last threads in nonferrous materials. Spindle rotation, automatically synchronized, properly retracts taps. Light tapping pressures increase tool life and eliminate breakage, the manufacturer says. The low speed spindle also allows heavy duty tapping or drilling. Speed range of the setup is from 80 to over 8000 rpm. Maximum capacities in mild steel for taps are four 3/8; six or more 10/32; 5/8-in. single spindle. For drills, it's four 5/16; six or more 3/16; inch 5/8-in. single spindle, its maker says. (Renco-Toledo, Inc.)

For more data circle No. 45 on postcard, p. 129

Walkie-type Platform Uses A Pusher Bar



This walkie-type platform truck has a pusher bar for self-unloading. It is especially designed to permit loading of freight cars and highway trailers with long flat loads such as steel sheet. No pallet or other load supporting device is needed since the load rides on the truck's platform; thus, the problem of returnable pallets is eliminated. Loads are preassembled on dunnage and the truck is driven beneath. The platform is raised under the load for pick-up. After positioning in the freight car or trailer, a pusher bar pushes the load off the platform onto the floor. (Moto-Truc Co.)

For more data circle No. 46 on postcard, p. 129

all!

half your "hole" engineering and production. All you do is squeeze a trigger, and you've got a threaded* projection end-welded straight, strong and accurate! It looks like a bolt, but it has no useless head sticking out the other side through the inevitable (and wholly unnecessary) hole!

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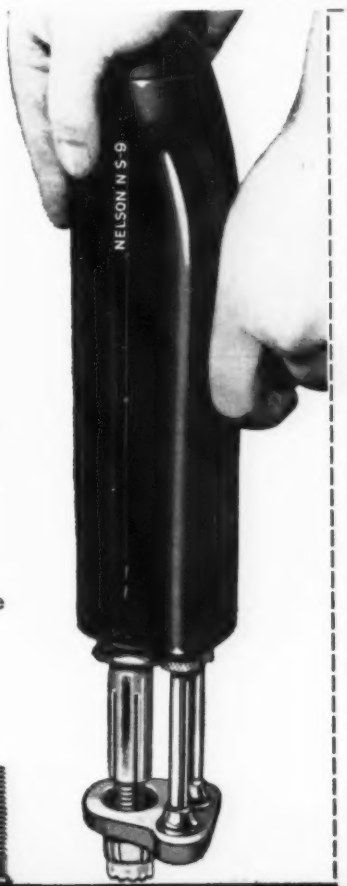

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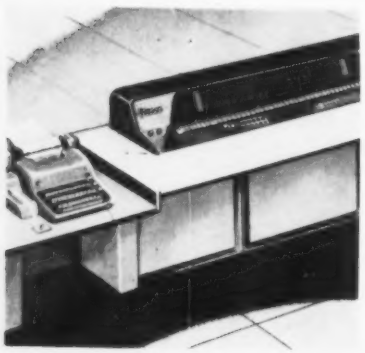

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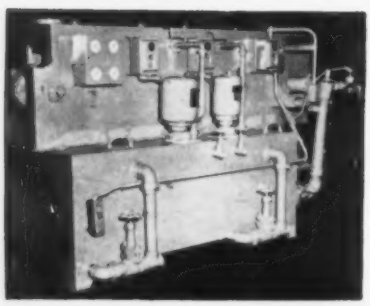

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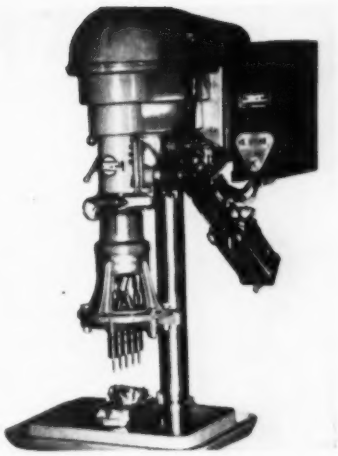

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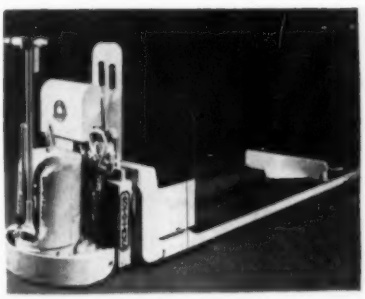

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For more data circle No. 46 on postcard, p. 129

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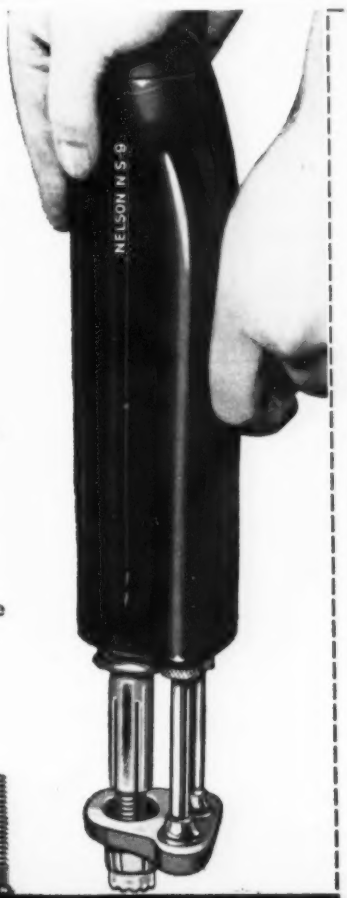

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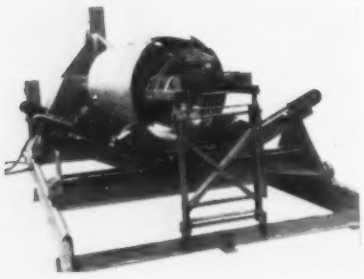

Machine Grinds, Polishes Large Cylinders

For polishing inside diameters of open end cylindrical tanks, this grinder-polisher produces a uniform longitudinal scratch pattern. Designed for tanks from 33-in. to 20-ft diam and up to 12-ft long, the machine uses a coated abrasive belt. The belt mounts on a traversing grinding head which lifts the work at the end of each pass. This allows the tank to rotate. The rate of carriage travel is variable. All controls are centralized on a master panel. It has a 6500-spm belt speed. (Hi-Lite Polishing Machine Co.)

For more data circle No. 47 on postcard, p. 129

Drills Are Extra Long

Extra long drills are now available in high speed steel with straight shank; wire gage sizes No. 52 through No. 1 and fractional sizes 1/16 through ½ in. Taper Shank size range is ⅛ through 1½ in. (Chicago-Latrobe).

For more data circle No. 48 on postcard, p. 129

Powder Tool Fastens

This piston-driven, powder-actuated fastening tool fastens sheet metal to concrete. The tool can be used for attaching conduit boxes, pipe straps, door bucks, window frames, furring strips, heating ducts, partitions, panel boxes, metal and

wooden signs to buildings; carpets to concrete flooring; and highway dividing markers and other wood or sheet metal articles to concrete. The hammer, firing a blank cartridge, can drive a specially developed nail stud through sheet metal, firmly anchoring the object to concrete. Ricocheting is prevented because the nail stud is pushed into the work surface, rather than shot. It is safe from accidental firing at all times,

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SPECIALISTS in Castings for
• Machinery Makers
• Manufacturers of Earth Moving Equipment
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Good drums, carefully cast and machined, are a typical Alten product. Advance techniques employed by Alten result in features that really stand out in comparison tests and actual operation. If you want a quality cast and machined part, that really gives service, Alten just can't be beat.

Alten has the experience and ability to solve the unusual and complex problems that often go along with custom castings. You get extra qualities and pay no more. These include: greater strength and rigidity, abrasion, heat and corrosion resistance, closer tolerances, increased vibration dampening, more durability and many other advantages.

If you are using drums or similar parts, or if you have had difficulty obtaining specialized castings — ask Alten the next time. Our experience on this type work may offer you an improved product — at lower cost.

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Since 1889
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FOUNDRY and MACHINE WORKS, INC.
Lancaster, Ohio

since it cannot be set off until in actual work position. (Velocity Power Tool Co.)

For more data circle No. 50 on postcard, p. 129

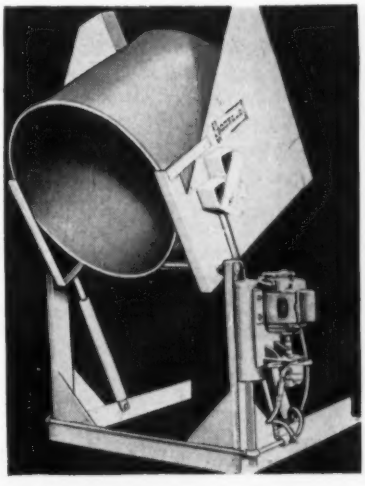
Valves Take 15,000-psi

Shut off valves rated for liquid or gases of 10,000 psi will withstand surges of up to 15,000 psi without damage to the valve. They are designed for a burst pressure of 40,000 psi. Valves can be furnished for pipe, tube, AND 150 or any preferred special high pressure connection. (Barksdale Valves.)

For more data circle No. 51 on postcard, p. 129

Setup Dumps Loads

Designed to elevate loads to 2000 lb, this hydraulic dumper raises them to 60 in. Its key features are: ruggedness, stability, operational ease, and safety factors. Highly portable, the electric motor driven dumper utilizes a 12-v battery or conventional power line as a source of electricity. Splash proof and explosion proof power features come as an extra. Like other equipment of this type, it is designed to reduce handling costs and accident hazards.



Available for a wide range of applications, it adapts to dumping drums, vat boxes, box trucks and specially shaped containers. (Uhrden, Inc.)

For more data circle No. 52 on postcard, p. 129

DESIGNED FOR DESIGNERS

Designers are often stumped when looking for new methods and new materials to dress up products. The inclusion of Hendrick perforated metal in product fabrication not only helps increase a product's overall attractiveness but also adds to its saleability as well! Perforated metal, masonite, rubber, plastic, and insulated board can be used in the design of: automobiles, furniture, buildings, appliances, notions, novelties, machines, equipment, and other products. Hendrick has hundreds of attractive designs to choose from. In Commercially rolled metals and gauges to meet exact needs.

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- FURNISHED COMPLETE
- CUSTOM CUT FROM YOUR BLANKS
- HEAT-TREATED, CASE OR FLAME-HARDENED

SIMONDS GEAR produces a complete line of industrial cut gears in a full range of sizes from cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite. Also heat-treated, case or flame-hardened carbon or alloy steel. Or, you may have your own gear blanks custom cut to your order. Same quality . . . same prompt service. Send us your requirements for quotation.

ALSO stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

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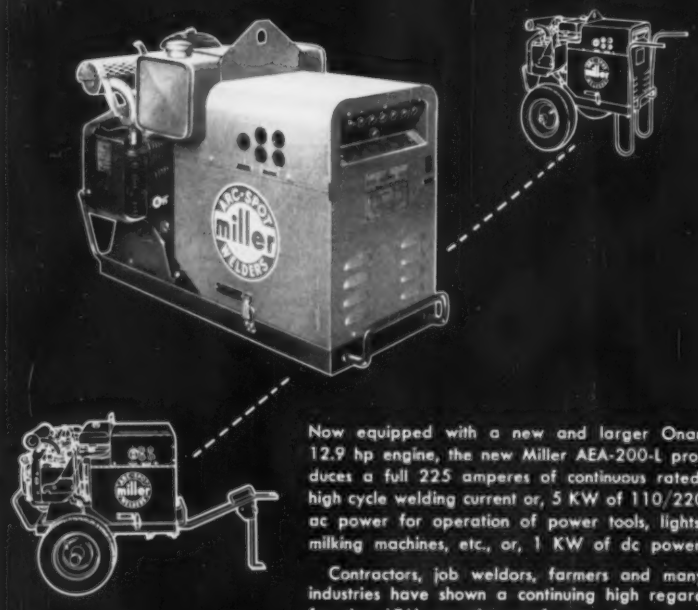
LIBERTY at 25TH PITTSBURGH 22, PA.
Quality Gears for over 60 years

Contour Projector Handles Optical Gaging

Increased versatility is promised for this new contour projector. The optical gaging unit uses a micrometer device for horizontal measurements. It features ample table travel to simplify gaging. Its maker says that it is ideal for receiving-inspection operations. The projector includes as standard equipment a movable work table with both horizontal and vertical traverse. Of special interest to metals checkers is its horizontal measurement device. In combination with a high-contrast viewing screen, the measurement setup makes possible "magnified" micrometric measurements for toolroom optical gaging. (Eastman-Kodak Co.)

For more data circle No. 53 on postcard, p. 129

NEW!



Now equipped with a new and larger Onan 12.9 hp engine, the new Miller AEA-200-L produces a full 225 amperes of continuous rated, high cycle welding current or, 5 KW of 110/220 ac power for operation of power tools, lights, milking machines, etc., or, 1 KW of dc power.

Contractors, job weldors, farmers and many industries have shown a continuing high regard for the AEA's weatherproof ruggedness, easy portability and instant changeover versatility from ac-dc welder to power plant to pipe thawer.

Twin model, AEA-200, does not offer 110/200 power. Both welders may be equipped with rubber-tired running gear or road trailer. Complete specifications sent on request.

". . . If it's Miller you know it's the finest . . ."

miller Electric Manufacturing Company, Inc.

distributed in Canada by CANADIAN LIQUID AIR CO., LTD., Montreal

Regulates Mill Speeds

This dual-circuit, variable-speed electronic mill regulator works with high-performance, continuous-process mills. It handles drive control on machines requiring the performance capable only through use of electronic control coupled with continuity of performance. It operates

on two sets of output thyratron tubes operating in parallel. Each set of tubes will handle the output load without exceeding the tube rating. In normal operation, the tubes tend to share the load. However, in the case of tube failure in one half of the regulator, the two tubes in the operable half instantly and automatically carry the entire load. The use of thyratron tubes in the power output section does away with circuit tuning and matching. (Reliance Electric & Eng. Co.)

For more data circle No. 54 on postcard, p. 129

designed and built by . . .

UNITED®

HIGH SPEED
5-STAND
TANDEM COLD MILL

UNITED

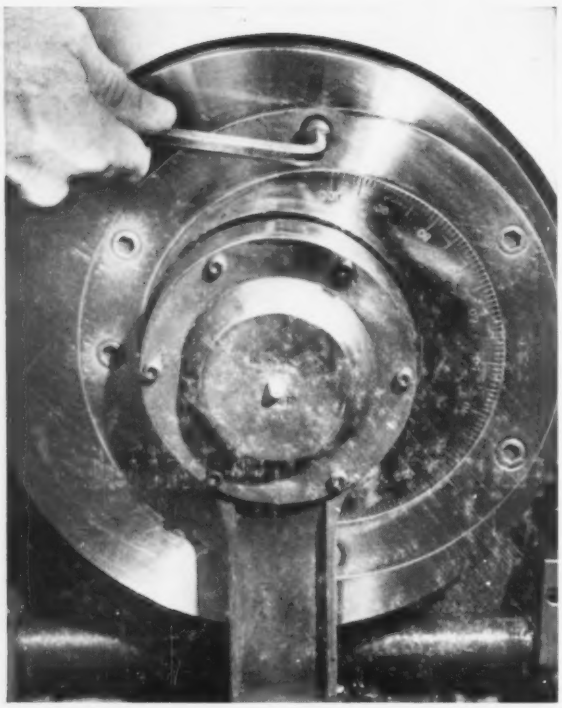
ENGINEERING AND FOUNDRY COMPANY

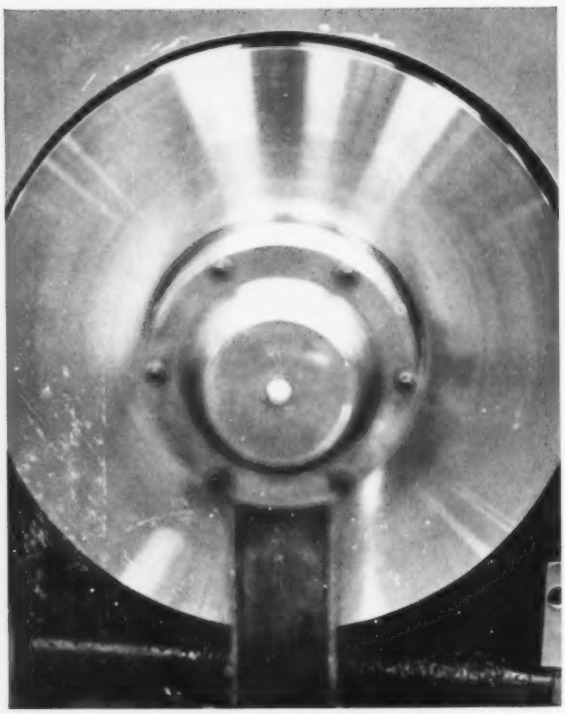
PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

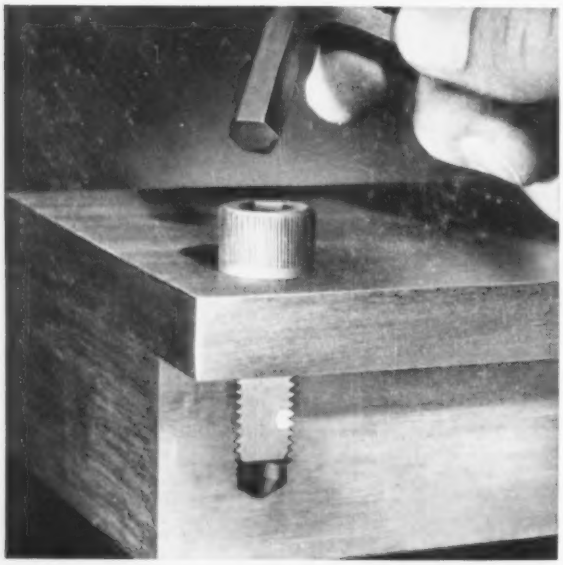




Self-locking UNBRAKO socket screws keep critical adjustments secure in the eccentric drive mechanism of this fatigue testing machine. Drive system delivers varying loads up to 15,000 pounds force to equipment under test at 1050 cycles per minute.

Vibration won't loosen Self-locking UNBRAKO socket cap screws

Screws with Nylok* device permit adjustments, keep precise settings during long test runs



HOW IT LOCKS. The tough, resilient Nylok locking pellet keys itself into the mating threads. It forces threads together, and locks the screw securely—whether or not the screw is seated.

UNBRAKO socket screws with the Nylok self-locking device stay tight under constant vibration.

Take the eccentric drive system in the fatigue testing machine illustrated above, for example. This machine must frequently run for periods up to 2 weeks or longer, day and night, to complete a single test. Loosening of the screws which are used to adjust the tension-setting mechanism could not only cause damage to the machine, but also make the test data worthless. Self-locking UNBRAKO socket head cap screws eliminate such problems.

An UNBRAKO socket screw with the Nylok self-locking device is a single unit. Just screw it into any tapped hole. Seated or not, it locks positively wherever wrenching stops. Constant vibration or pounding, or endless running of a machine, won't affect these self-locking UNBRAKOS. The screws will not work loose!

Write today for your copy of Form 2193, which gives complete catalog and technical data on the entire line of UNBRAKO socket screws with the Nylok self-locking device. Or see your authorized industrial distributor. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

UNBRAKO SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

*T.M. Reg. U.S. Pat. Off. The Nylok Corporation

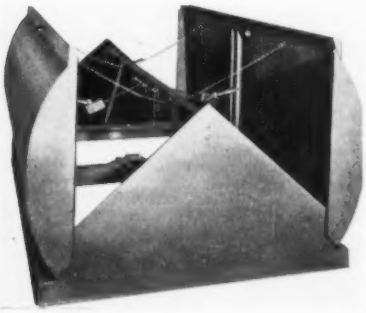
Rotary Machines Cut Pipe-joining Time

New offset rolls for a firm's rotary machines reduce pipe-joining time. The specially designed rolls speed joining of round, heavy-gage elbows and pipe sections. One set of rolls and a gage do the edging job in a single operation. Of hardened, polished steel, they come for both hand and power models of combination rotary machines. Using a novel method, the units offset a flange on one edge of each pipe or elbow section. The plain edge of the connecting piece slides into the flange; the pipe is then ready for welding, riveting or any other type fastening. Designed to speed installation of industrial blower, exhaust and conveyance systems, the equipment continuously forms the flange to various angles for mating elbow segments. And the operator doesn't have to remove the work from the machine. Flush, snug-fitting joints eliminate obstructions to flow within the pipe. An adjustable gage permits forming flanges of varying widths for riveted or welded joints. (Niagara Machine & Tool Works).

For more data circle No. 55 on postcard, p. 129

Fire Vent Opens Fast

A new quick-opening vent permits rapid escape of smoke, heat and gases in event of fire. The unit



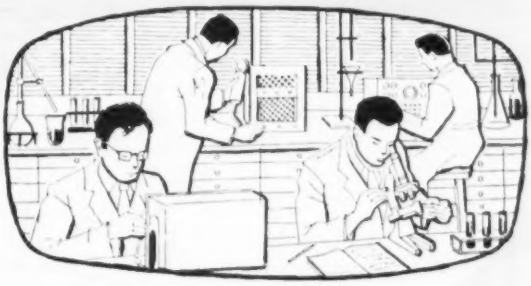
installs and operates entirely above the roof line. Two double-wall dampers are opened outward by powerful coil springs when a fusible link melts at 212°F. (The Swartwout Co.)

For more data circle No. 56 on postcard, p. 129

Work Rough, Fine Cuts

Heavy-duty lathes are available that can be used with equal effectiveness on rough or precision cuts. They feature a 75 hp headstock (it will handle peak loads up to 100 hp) and 24 spindle speeds in true geometric progression from 6 to 750 rpm. It has a 40-in. swing capacity over the bedways and 25 in. over the cross slide. Alexson Mfg. Co.)

For more data circle No. 57 on postcard, p. 129



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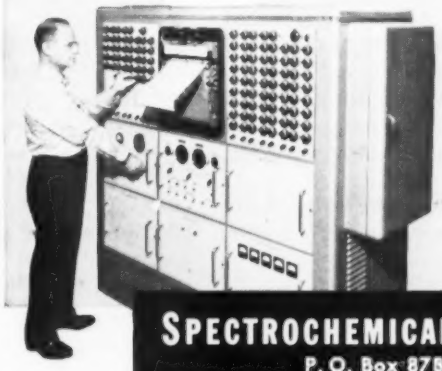

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The Iron Age Summary

Mills Reach Out for Business

Some steel producers are going far afield to bolster order books.

The hard sell is cutting into profit margins as more mills absorb freight charges.

Competition is forcing steel mills to reach out for sales. Some producers are courting steel users in areas well beyond their normal market zone.

What this means is that the mills are now willing to settle for a lesser profit margin to maintain volume production. To compete in distant market areas, they must absorb freight charges. This trend is particularly apparent in the East, where some Pittsburgh and Detroit mills are actively beating the bushes.

For the first time in over two years, exclusive of strike-affected periods, the steel ingot rate is scheduled to drop this week to below 90 pct. Operations are scheduled at 89.7 pct. The drop reflects in part scheduled curtailment of operations by some mills on Good Friday, which for the first time is a paid holiday in steel labor contracts.

Mills on Tenterhooks — Meanwhile, users of sheet, strip, bar, and wire products are running their new-found independence into the ground. They're keeping the mills on tenterhooks. They're holding back on orders until the last minute, creating a serious scheduling problem for producers.

This is tending to defeat the stabilizing effect of the long-term steel labor contract. It also indicates that some users are counting on the mills to handle emergency rush orders should they be caught short.

The Hard Sell—In the absence of hopeful news from Detroit, steel people are becoming resigned to a generally slow market in second quarter. Automotive companies apparently are still working off excess inventories. Cold-rolled sheet demand is worse than at any time since 1954. Hot-rolled sheet business is little better.

Aggressive selling is the watchword in steel. More salesmen, including sales managers and their assistants, are out on the road. Tie-in sales—where a hard-to-get product is used to sell easier items—are becoming commonplace.

Strong Points—Demand for heavy steel products is brisk. Orders for plate, shapes, and pipe are holding up the steel ingot rate. Mills in a position to supply users of these products are operating at above capacity. In the pipe market, interest centers on pipeline projects involving close to 350,000 tons of linepipe.

An IRON AGE check on backlogs shows that unfilled steel orders are off slightly from a month ago with some firms. But with others the difference is insignificant.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,297	2,317	2,407	2,462
Ingot Index				
(1947-1949=100)	143.0	144.2	149.8	153.3
Operating Rates				
Chicago	87.0	90.0*	88.0	100.5
Pittsburgh	93.0	96.0*	95.0	104.0
Philadelphia	103.0	102.0	103.0	106.0
Valley	87.0	87.0*	94.0	98.0
West	100.0	102.0	101.0	103.0
Buffalo	93.0	93.0	95.0	105.0
Cleveland	88.0	86.0*	91.0	102.0
Detroit	98.0	96.0	94.0	100.0
S. Ohio River	64.0	63.0*	85.0	94.0
South	95.5	96.0	99.0	93.0
Upper Ohio R.	87.0	95.0*	94.0	102.0
St. Louis	99.0	101.0	102.0	95.0
Northeast	64.0	66.0	66.0	93.0
Aggregate	89.7	90.5	94.0	100.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.670	5.670	5.670	5.179
Pig Iron (Gross Ton)	$64.56	$64.56	$64.56	$60.29
Scrap, No. 1 hvy (Gross ton)	$42.17	$42.67	$48.17	$55.50
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	25.90
Copper, Electrolytic	32.00	32.00	32.00	46.00
Lead, St. Louis	15.80	15.80	15.80	15.80
Magnesium ingot	36.00	36.00	36.00	34.50
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	99.875	99.125	99.50	99.625
Zinc, E. St. Louis	13.50	13.50	13.50	13.50

*Revised

Buyer Doubts Mix Up Order Books

Bulletin—A late purchase in Philadelphia established the price of No. 1 heavy melting at $45 to $46 in that market.

THE IRON AGE Composite price declined to $42.17.

▪ Doubt-ridden buyers are continuing on-again, off-again ordering and scrambling mill order books.

Products affected are those now in easy supply—sheet, strip, and bar. Customers of a large Eastern flat-rolled producer, for example, are already trying to move orders back into the third quarter. The mill finds it a little difficult since third quarter books aren't opened yet.

Cold-rolled sheet buyers, in particular, are showing a great tendency to blow hot and cold. One Midwestern consumer changed his mind about May tonnages three times in two weeks. Warehouses there report users order, then reduce the amount requested, later cancel out and finally reinstate part of the tonnage, all within a few days.

Get It Out—Nor are buyers the only ones shifting about from foot to foot. After deciding to go full steam ahead on sheet mill plate rolling in the third quarter, one mill took a look at in-coming hot-rolled bookings and changed its mind.

Mills are finding it necessary, with the current sheet-bar slackness, to schedule orders as promptly as possible. If they don't customers interested in quick delivery simply take their business elsewhere. As a result the producers are putting more emphasis on customer service. Two large Eastern bar mills, for example, are considering publishing a weekly rolling schedule. Hope is consumers in the market for the sizes and shapes being scheduled will come through with orders.

Sheet and Strip—Market continues weak. Buyers at **Chicago** want no more than three weeks lead time for their cold-rolled sheet commitments. And, in some cases, because of cancellations, mills have been able to deliver in two weeks. Sheet coming from **Detroit** at prices under local levels is hitting **Chicago** warehouses hard.

A slight pickup in cold-rolled sheet orders at **Pittsburgh** is still nothing to arouse excitement. Mills there feel automakers cannot go on indefinitely operating with inventories down to 15 days. **Detroit** producers see a pickup due at the end of May or early in June. One auto firm has increased sheet orders for June, to a degree. A large **Philadelphia** area producer is rolling light plate on sheet-strip facilities.

Bar—There's some market variation from weak in the East to fairly good at **Chicago** and strong on the **West Coast.** Bar producers in the **Pittsburgh** area, plagued with short customer leadtimes, are considering publishing weekly rolling schedules. May ordering is shaping up about the same as April's. The market seems to have stabilized after the downward adjustment at the end of March.

All types of bar—hot-rolled, cold finished, alloy and stainless—are weak in the **Philadelphia** market.

However at **Chicago** at least three district mills have gone out into June on bookings for hot-rolled bar. Cold finishers aren't a factor in keeping the market active. What's being booked is going to other consumers, such as the farm equipment manufacturers. Some cold finishers are on a 3-day week and there's no sign of an automotive pickup.

Softening bar picture in the rest of the country is being reflected in the **West Coast** market.

Plates and Shapes — Customers are using the current market slackness in the lighter products to better their ordering and inventory picture.

At **Chicago,** for example, local buyers are getting light structurals from out-of-the-area mills. Then they reserve their full quota for Chicago area mills in the heavier products. Local mills there are still rolling sheet mill plate and it's been sold out through the second quarter. Tight plate market is getting a little aid at **Philadelphia** as Bethlehem begins turning out sheared plate on its new 160-in. mill at Sparrows Pt. Light plate picture at **Detroit** is described as spotty. Rolling continues, however, with some of the product going into fabrication of oil country goods. On the **West Coast,** for the first time in two years, wide flange beams are easier to get.

Pipe and Tubing—Bethlehem has begun production on its new electric resistance weld pipe mill at Sparrows Pt. Some tonnage from the mill—which can produce pipe in the 5 to 12 in. range—has already gone out.

Pittsburgh reports capacity bookings for seamless oil country products for the rest of the year.

PURCHASING AGENT'S CHECKLIST

How close is commercial production of H-Iron? **P. 72**

Kaiser Steel will double its producing capacity. **P. 90**

What's best machine tool replacement guide? **P. 92**

COMPARISON OF PRICES

(Effective April 16, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	April 16 1957	April 9 1957	Mar. 19 1957	April 17 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.28
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stainl's C-R strip (No. 302)	50.00	50.00	50.00	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.95	$9.95	$9.95	$9.45
Tin plates, electro (0.50 lb.)	8.65	8.65	8.65	8.15
Special coated mfg. ternes	9.20	9.20	9.20	8.70
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.60¢
Rails: (per 100 lb.)				
Heavy rails	$5.275	$5.275	$5.275	$4.725
Light rails	6.25	6.25	6.25	5.65
Semifinished Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.625	4.625*	4.625*	4.225
Finished Steel Composite: (per pound)				
Base price	5.670¢	5.670¢	5.670¢	5.179¢

	April 16 1957	April 9 1957	Mar. 19 1957	April 17 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$68.88	$68.88	$68.88	$65.26
Foundry, Valley	65.00	65.00	65.00	60.50
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	65.00	65.00	65.00	60.50
Basic, del'd Philadelphia	68.38	68.38	68.38	64.43
Basic, Valley furnace	64.50	64.50	64.50	60.00
Malleable, Chicago	65.00	65.00	65.00	60.50
Malleable, Valley	65.00	65.00	65.00	60.50
Ferromanganese, cents per lb‡ 74 to 76 pct Mn base.	12.75¢	12.75¢	12.75¢	9.50¢
Pig Iron Composite: (per gross ton)				
Pig iron	$64.56	$64.56	$64.56	$60.29
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$41.50	$41.50	$49.50	$56.50
No. 1 steel, Phila. area	*45.50*	47.00	51.50	55.50
No. 1 steel, Chicago	39.50	39.50	43.50	54.50
No. 1 bundles, Detroit	34.50	34.50	41.50	53.50
Low phos., Youngstown	41.50	41.50	48.50	61.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	54.50	58.50
No. 1 mach'y cast, Philadel'a	55.50	55.50	55.50	55.50
No. 1 mach'y cast, Chicago	45.50	45.50	48.50	57.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$42.17*	$42.67	$48.17	$55.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	32.00	32.00	32.00	46.00
Copper, Lake, Conn.	32.00	32.00	32.00	46.00
Tin, Straits, New York	99.875†	99.125	99.50	99.625
Zinc, East St. Louis	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80
Aluminum, virgin ingot	27.10	27.10	27.10	25.90
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	34.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 174→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Aurdabore, Pa. *B6*	66.50	67.00	67.50	68.00	.....
Birmingham *R3*	58.50	59.00*	.....	.....	.....
Birmingham *W9*	58.50	59.00*	63.00	.....	.....
Birmingham *U4*	58.50	59.00*	63.00	.....	.....
Buffalo *R3*	64.50	65.00	65.50	66.00	.....
Buffalo *H1*	64.50	65.00	65.50	66.00	.....
Buffalo *W6*	64.50	65.00	65.50	66.00	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	64.50	65.00	65.00	65.50	.....
Cleveland *A5*	64.50	65.00	65.00	65.50	69.50†
Cleveland *R3*	64.50	65.00	65.00	65.50	.....
Duluth *I4*	64.50	65.00	65.00	65.50	69.50†
Erie *I4*	64.50	65.00	65.00	65.50	69.50†
Everett *M6*	66.00	66.50	67.00	.....	.....
Fontana *K1*	72.50	73.00	.....	.....	.....
Geneva, Utah *C7*	64.50	65.00	.....	.....	.....
Granite City *G2*	66.40	66.90	67.40	.....	.....
Hubbard *Y1*	.....	.....	65.00	.....	.....
Ironton, Utah *C7*	64.50	65.00	.....	.....	.....
Midland *C11*	64.50	.....	.....	.....	.....
Minnequa *C6*	66.50	67.00	67.50	68.00	.....
Monessen *P6*	64.50	.....	.....	.....	.....
Neville Is. *P4*	64.50	65.00	65.00	65.50	69.50†
N. Tonawanda *T1*	.....	65.00	65.50	66.00	.....
Sharpsville *S3*	64.50	65.00	65.00	65.50	.....
So. Chicago *R3*	64.50	65.00	65.00	.....	.....
Swedeland *A2*	66.50	67.00	67.50	68.00	.....
Toledo *I4*	64.50	65.00	65.00	65.50	.....
Troy, N. Y. *R3*	66.50	67.00	67.50	68.00	72.50
Youngstown *Y1*	.....	.....	65.00	65.50	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31–0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo, *H1*, $78.50; Jackson, *J1*, *I4* (Globe Div.), $77.25; Niagara Falls (15.01–15.50), $99.50; Keokuk (14.01–14.50), $110.00; (15.51–16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery 6 pct to 14 pct.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50	—	16.00	27.75	16.25
Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75	—	20.75	—	21.00
Billets, forging	—	35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Bars, struct.	40.50	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	36.25	32.50	33.00	33.00
Plates	42.50	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00	—	29.75	—	30.75
Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	39.25	40.25–40.50	41.00–41.25	44.00	43.75	66.75–67.00	50.50–51.00	59.25–59.50	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J3*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1*; New Bedford, Mass. (.25¢ per lb higher), *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*; Gary, *U1*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*.

Scrap Drop Comes To a Halt

Unanswered question is whether prices will firm at present levels.

Dealers appear to be determined to halt decline and lay down scrap at present prices.

■ The dealer freeze is on and the three-months drop in the scrap market is at a halt, or at least a pause.

It's too early to say with authority that the market has leveled off, or that the market is firm at its present level. There is no strong demand for scrap. The pause may be due more to dealer refusal to sell than to any attempts by mills to establish a floor at this point.

But temporary or not, the headlong fall of the market is halted in all markets. In Cleveland, prices on steelmaking grades edged upward on mill purchases. This is the only market where prices actually rose.

Elsewhere, No. 1 grades held at present levels. In some cases they could hardly be called firm. All markets indicated at least strong dealer hope that the bottom of the market had been reached.

Some markets are still out of line, compared with normal differentials that usually exist in geographic relationships. In some markets, talk of holding scrap had less authority than others where brokers are having real difficulty filling orders.

A tipoff of real condition of the market may come with closing of May automotive lists. Amount of scrap will be significantly lower than in recent months and bidding will indicate how strong mill demand is.

Pittsburgh — Prices of most grades are unchanged this week. The market is still very quiet, but there are signs prices may be near bottom. The price of No. 1 railroad heavy melting was higher on late lists than on earlier ones. This is in line with the normal pattern, but is the reverse of last month's. Attempts by one mill to buy No. 2 bundles at $30 failed.

Chicago—Movement of scrap in this market continued at a slow pace. Forecasts for the market future vary widely, but a number of yards and some brokers are reportedly laying down scrap. Further price slips occurred, but comment that the market seems to have hit a temporary leveling is general.

Philadelphia—The market is uncertain, with small sales reported at prices varying from $47.00 to $48.50 for No. 1 heavy melting. In the absence of a clearly defined trend in either direction, prices of primary grades remain unchanged. Railroad grades are down and turnings are weak.

New York—Prices remained unchanged in a quiet market. There is growing feeling that the end of the price slide may have been reached.

Detroit—The market appears to have leveled off temporarily here. Both brokers and dealers feel that recent declines may have halted for the time being. May auto lists will be closing soon, and an expected drop in the amount of scrap available is expected to keep the market close to its present level.

Cleveland—Small sales in Cleveland and the Valley indicate the market is somewhat stronger. Most of the scrap had been going out of district at lower prices, much of it distress scrap. Local sales and buys from fringe mills brought prices up in both Cleveland and the Valley. But continued low prices have dried up sources and not much scrap is moving.

St. Louis—As a result of lower prices, movement of scrap to the St. Louis district has slowed sharply, and receipts are below consumption rates. It is expected that an increase will be necessary to bring out more supplies. In the meantime, all except some cast grades are unchanged.

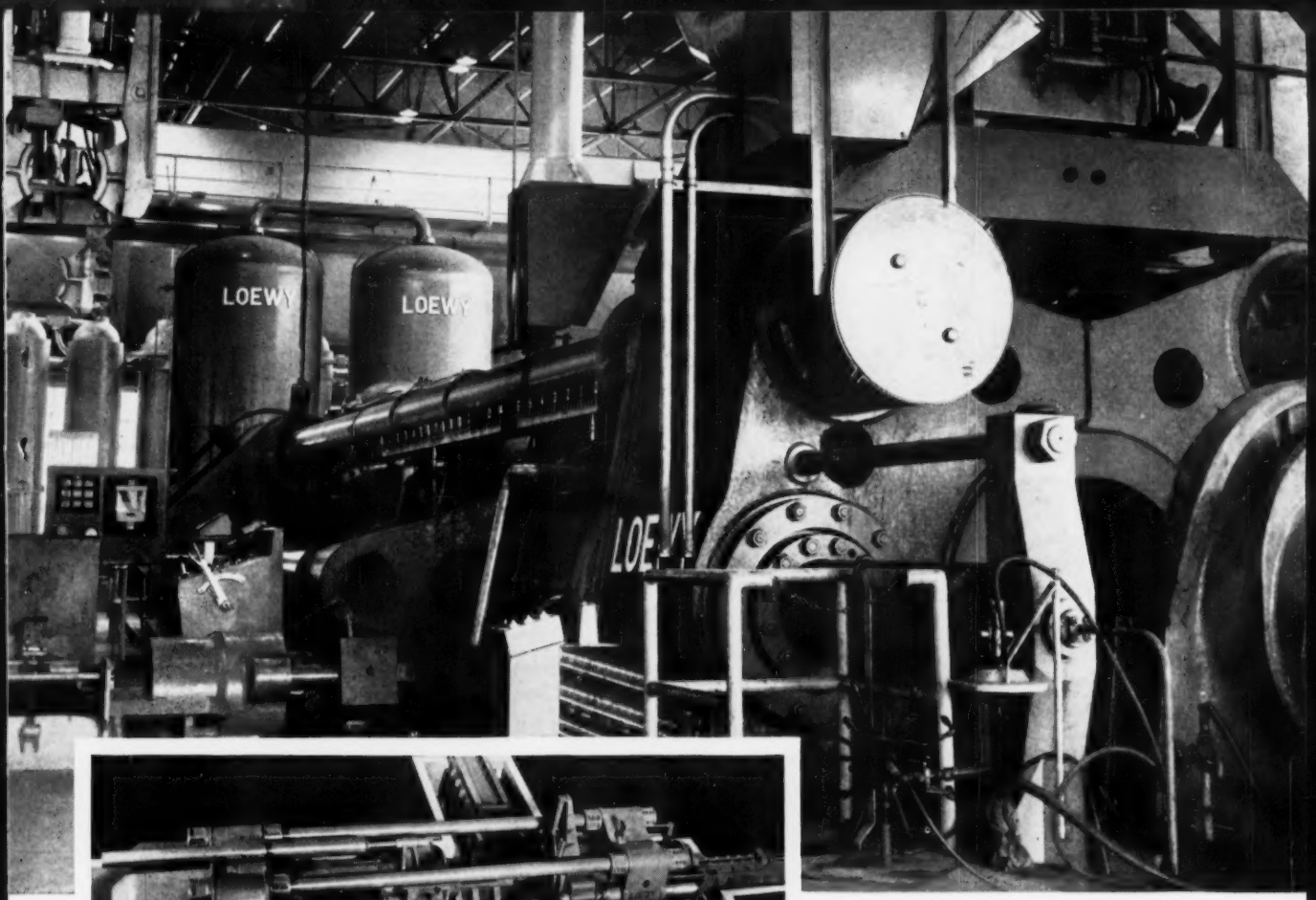
Birmingham — Movement of scrap continues sluggish. Only one openhearth consumer is buying and its purchases are limited to No. 2 heavy melting and No. 2 bundles. There is a little activity in electric furnace grades. Most mills have good inventories, however, and are buying only for replacement.

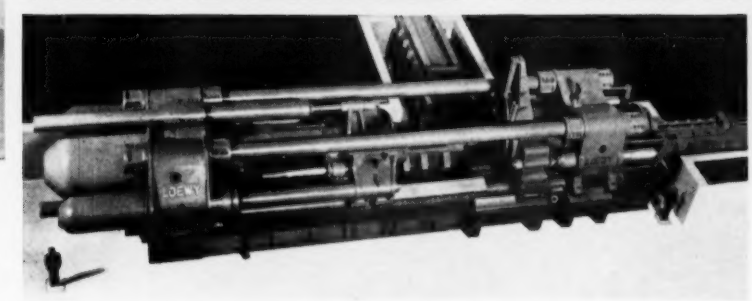
Cincinnati—Dealers are holding back on what little scrap they have, indicating they are hoping for a better price soon. Local brokers are having some difficulty covering purchases for this month.

Buffalo—The market is marking time with no activity reported. Some scrap men feel the bottom of the barrel has been reached.

Boston — For the first time in seven weeks, there are no changes in top grades. The market is slow, although one consumer was in the market last week. Opinion at the moment is that prices are nearing the leveling off point.

West Coast—Mills here are loaded with scrap. They are buying cautiously. Over 100,000 tons are going to Japan from San Francisco, Los Angeles and Seattle during April.





12,000-ton extrusion press designed and built by Loewy-Hydropress for the U.S. Air Force Heavy Press Program and operated by the Metals Processing Division of Curtiss-Wright Corporation, Buffalo, N.Y.

•

Scale model of 12,000-ton extrusion press showing its enormous length. It was used for training the erection crew.

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SCRAP PRICES *(Effective April 16, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and ms. turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. punch'gs plate	45.00 to 46.00
Heavy turnings	36.00 to 37.00
No. 1 RR. hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	59.00 to 60.00
Rails 2 ft and under	61.00 to 62.00
RR. steel wheels	56.00 to 57.00
RR. spring steel	56.00 to 57.00
RR. couplers and knuckles	56.00 to 57.00
No. 1 machinery cast	50.00 to 51.00
Cupola cast	43.00 to 44.00
Heavy breakable cast	41.00 to 42.00

Chicago

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	36.00 to 38.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Low phos. forge crops	52.00 to 53.00
Low phos. punch'gs plate	46.00 to 47.00
Low phos. 3 ft and under	46.00 to 47.00
No. 1 RR. hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	53.00 to 54.00
Rerolling rails	55.00 to 56.00
Rails 2 ft and under	55.00 to 56.00
Locomotive tires cut	51.00 to 52.00
Cut bolsters & side frames	49.00 to 50.00
Angles and splice bars	54.00 to 55.00
RR. steel car axles	70.00 to 71.00
RR. couplers and knuckles	48.00 to 49.00
No. 1 machinery cast	45.00 to 46.00
Cupola cast	39.00 to 40.00
Heavy breakable cast	38.00 to 39.00
Cast iron brake shoe	39.00 to 40.00
Cast iron wheels	47.00 to 48.00
Malleable	54.00 to 55.00
Stove plate	39.00 to 40.00
Steel car wheels	51.00 to 52.00

Philadelphia Area

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	36.00 to 38.00
No. 1 dealer bundles	46.50 to 47.50
No. 2 bundles	35.00 to 36.00
No. 1 busheling	46.50 to 47.50
Machine shop turn.	31.00 to 32.00
Mixed bor. short turn.	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Shoveling turnings	35.00 to 36.00
Clean cast chem. borings	39.00 to 40.00
Low phos. 5 ft and under	52.00 to 53.00
Low phos. 2 ft and under	53.00 to 54.00
Low phos. punch'gs	53.00 to 54.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	42.00 to 43.00
RR. steel wheels	57.00 to 58.00
RR. spring steel	57.00 to 58.00
Rails 18 in. and under	66.00 to 67.00
Cupola cast	43.00 to 44.00
Heavy breakable cast	53.00 to 54.00
Cast iron car wheels	59.00 to 60.00
Malleable	61.00 to 62.00
Unstripped motor blocks	37.00 to 38.00
No. 1 machinery cast	55.00 to 56.00

Cleveland

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	39.00 to 40.00
No. 1 factory bundles	44.50 to 45.50
No. 2 bundles	31.00 to 32.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	27.50 to 28.50
Shoveling turnings	27.50 to 28.50
Cast iron borings	27.50 to 28.50
Cut struct'r'l & plates, 2 ft & under	45.00 to 46.00
Drop forge flashings	39.00 to 40.00
Low phos. punch'gs, plate	40.00 to 41.00
Foundry steel, 2 ft & under	43.00 to 44.00
No. 1 RR. heavy melting	44.00 to 45.00
Rails 2 ft and under	66.00 to 67.00
Rails 18 in. and under	67.00 to 68.00
Railroad grate bars	32.00 to 33.00
Steel axle turnings	30.00 to 31.00
Railroad cast	53.00 to 54.00
No. 1 machinery cast	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	54.00 to 55.00

Youngstown

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	34.00 to 35.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	43.00 to 44.00

Buffalo

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 busheling	41.00 to 42.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	27.00 to 28.00
Low phos. plate	46.00 to 47.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	60.00 to 61.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
RR. couplers and knuckles	49.00 to 50.00
No. 1 machinery cast	46.00 to 47.00
No. 1 cupola cast	42.00 to 43.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	34.00 to 35.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	34.00 to 35.00
No. 1 cupola cast	46.00 to 47.00
Heavy breakable cast	42.00 to 43.00
Stove plate	43.00 to 44.00
Automotive cast	52.00 to 53.00

St. Louis

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	32.00 to 33.00
Machine shop turn.	23.00 to 24.00
Cast iron borings	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
No. 1 RR. hvy. melting	44.00 to 45.00
Rails, random lengths	48.00 to 49.00
Rails 18 in. and under	58.00 to 59.00
Locomotive tires uncut	50.00 to 51.00
Angles and splice bars	54.00 to 55.00
Std. steel car axles	67.00 to 68.00
RR. specialties	50.00 to 51.00
Cupola cast	41.00 to 42.00
Heavy breakable cast	38.00 to 39.00
Cast iron brake shoes	41.00 to 42.00
Stove plate	36.00 to 37.00
Cast iron car wheels	43.00 to 44.00
Rerolling rails	56.00 to 57.00
Unstripped motor blocks	35.00 to 36.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	36.00 to 37.00
Elec. furnace, 3 ft & under	40.00 to 41.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and short turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Clean cast. chem. borings	28.00 to 29.00
No. 1 machinery cast	42.00 to 43.00
Mixed cupola cast	35.00 to 36.00
Heavy breakable cast	42.00 to 43.00
Stove plate	33.00 to 34.00
Unstripped motor blocks	26.00 to 27.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	33.00 to 34.00
No. 2 dealer bundles	30.00 to 31.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	26.00 to 27.00
Clean cast chem. borings	30.00 to 31.00
No. 1 machinery cast	44.00 to 45.00
Mixed yard cast	39.00 to 40.00
Charging box cast	44.00 to 45.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	31.00 to 32.00

Birmingham

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	43.00 to 44.00
Bar crops and plate	46.00 to 47.00
Structural and plate, 2 ft	45.00 to 46.00
No. 1 RR. hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	48.00 to 49.00
Rails, 18 in. and under	53.00 to 54.00
Angles & splice bars	52.00 to 53.00
Rerolling rails	58.00 to 59.00
No. 1 cupola cast	48.00 to 49.00
Stove plate	47.00 to 48.00
Charging box cast	37.00 to 38.00
Cast iron car wheels	37.00 to 38.00
Unstripped motor blocks	38.00 to 39.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 2 ft & under	41.00 to 42.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	23.00 to 24.00
Low phos. 18 in. & under	48.00 to 49.00
Rails, random lengths	53.00 to 54.00
Rails, 18 in. and under	63.00 to 64.00
No. 1 cupola cast	43.00 to 44.00
Hvy. breakable cast	43.00 to 44.00
Drop broken cast	55.00 to 56.00

San Francisco

No. 1 hvy. melting	$51.00
No. 2 hvy. melting	46.00
No. 1 dealer bundles	50.00
No. 2 bundles	38.00
Machine shop turn.	35.00
Cast iron borings	33.00 to 35.00
No. 1 RR. hvy. melting	51.00
No. 1 cupola cast	57.00

Los Angeles

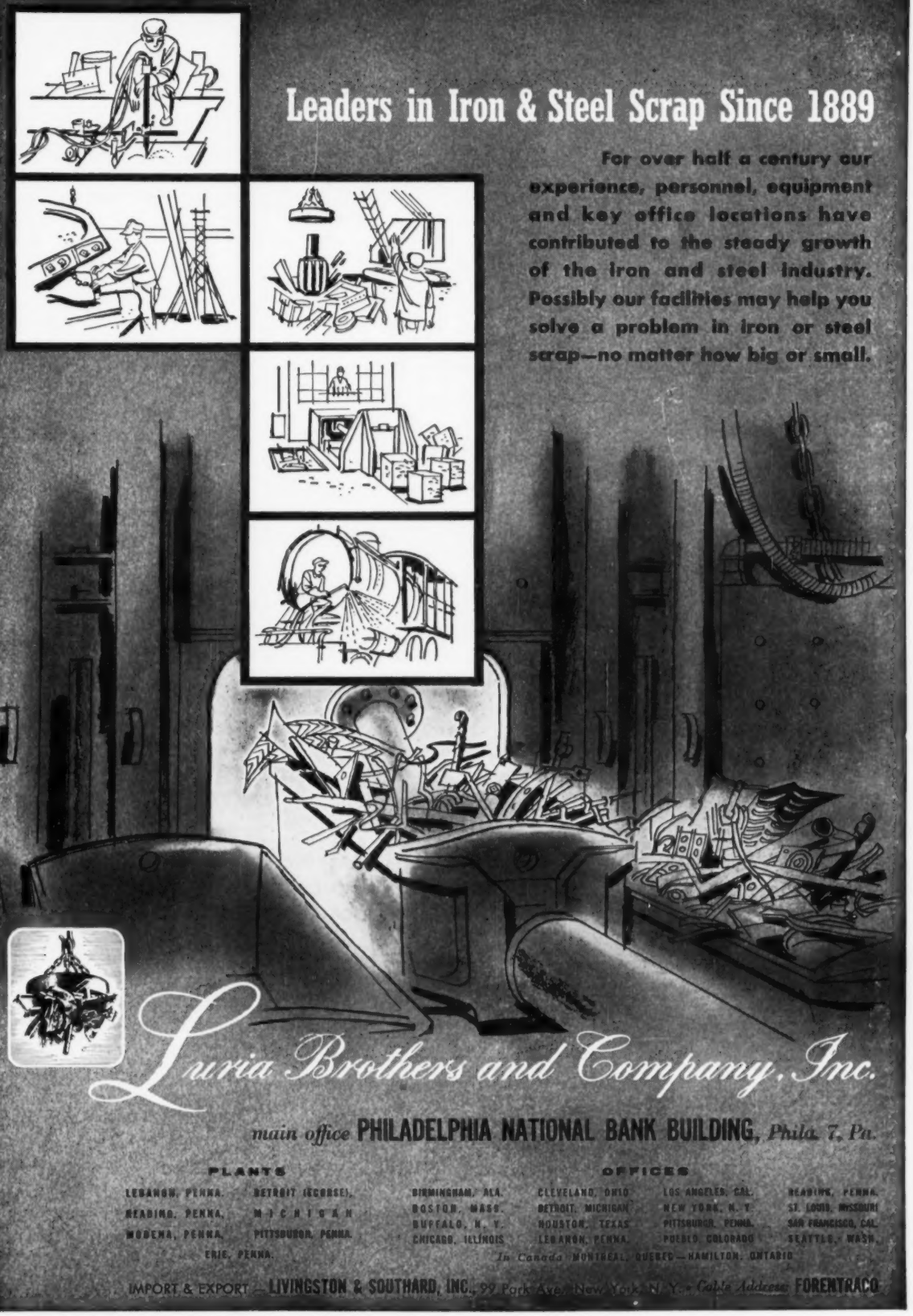
No. 1 hvy. melting	$51.00
No. 2 hvy. melting	46.00
No. 1 dealer bundles	50.00
No. 2 bundles	36.00
Machine shop turn.	35.00
Shoveling turnings	37.00
Cast iron borings	34.00
Elec. furn. 1 ft. and under (foundry)	62.00
No. 1 RR. hvy. melting	51.00
No. 1 cupola cast	$53.00 to 54.00

Seattle

No. 1 hvy. melting	$51.00
No. 2 hvy. melting	45.00
No. 2 bundles	30.00
No. 1 cupola cast	52.00
Mixed yard cast	52.00

Hamilton Ont.

No. 1 hvy. melting	$43.00
No. 2 hvy. melting	38.00
No. 1 dealer bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	40.00
Busheling	34.00
Bush., new fact., prep'd	43.00
Bush., new fact., unprep'd	37.00
Machine shop turn.	22.00
Short steel turn.	30.00
Mixed bor. and turn.	24.00
Rails, rerolling	54.00
Cast scrap	50.00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Business Slow for Diecasters

Job shops agree that orders are down from 1956 levels.

Auto buying drops most, but is expected to lead an upward trend by the third quarter.

▪ Spring hasn't sprung any rash of new orders for diecasters. Everyone reports a definite slump compared with the same period last year.

How many blank pages are left in order books, how bad the situation really is, and how soon it will begin to improve are questions on which there is disagreement.

How Soft—On the current degree of softness, reports vary from "loosened up a little bit," to "off 20 pct from the same period last year." One more optimistic diecaster says conditions are merely "not as lush as three months ago." He admits that forward bookings have softened up, but says he is still operating on three shifts.

When the market first eased, this firm considered closing down for two weeks during the summer. In the past, it operated all year with skeleton crews during the summer slack. However, the company reports the new plan has now been shelved in favor of continued operation.

May, June Slow—Another major firm, selling to almost every market except automotive, reports a 15 to 20 pct drop in orders from last year. Buying for May and June is slow, the sales manager says. He expects the curve to start upward sometime near the beginning of the third quarter. This will be the best quarter in 1957, he forecasts.

A diecaster selling most of its output to auto companies is more optimistic. A spokesman reports blanket orders from Detroit are not being released as fast as had been expected, but that none have been cancelled. The feeling is that automakers are reducing inventories, and that it will be just a matter of time until this is accomplished and order release schedules pickup.

Perfect Sample—A midwest diecaster has an unusual setup, which makes it a good cross section for market evaluation. The shop is captive, but only one-third of its output stays in the company. The remainder is for sale. And automotive buyers take about 60 pct of this.

On the basis of reports from this company, here's what the diecasting picture looks like:

Captive shops—Brightest side of the picture, with production holding up fairly well.

Automotive market — Demand from this market seems to be leading rather than following the overall downward curve. But prospects for a pickup in the third quarter are good.

Other than automotive — Off about 10 pct, not quite as far as automotive. But it looks like this market will lag slightly behind automotive in boosting buying.

Copper

The condition of the custom smelter market is somewhat confused. All of the major smelters are pegged at 31¢ per lb. One reports the trade is showing "some interest" at this price. The other says his market is "quiet, with not much buying at 31¢."

Defense Council of the Ingot Brass and Bronze Industry reports total shipments for March were 21,948 tons, up from 20,769 tons in February.

Tin

The big question in world tin circles this week. "Is the Tin Agreement buffer stock quietly acquiring metal?" New York tin is still crowding $1.00 per lb., but the price on the London Metals Exchange is now low enough to permit buying. The buffer stock manager may buy at 780 pounds sterling per ton. Current price is around 760 pounds sterling.

The trade won't get an official answer. If and when the buffer stock decides to acquire tin it will buy through a broker to begin with, to avoid influencing the price.

In New York the market is colorless for a change. Heavy arrival of unspoken for tin, both straits and from the continent, and lack of buyers, has eliminated the premium for spot. This situation is not expected to last long. Most traders feel there will be an adjustment upward for spot metal.

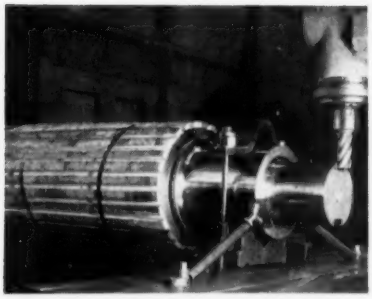
Tin prices for the week: April 10—98.875; April 11—99.25; April 12 — 99.125; April 15 — 99.75; April 16—99.875.*
* Estimate

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	32.00	34.00	2/18/57
Copper (CS)	31.00	30.50 -31.00	4/12/57
Copper (L)	32.00	34.00	2/19/57
Lead, St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	250 275	270 300	12/4/56
Zinc, E. St. L.	13.50	13.00	1/6/56
Zinc, N. Y.	14.00	13.50	1/6/56

ALUMINUM: 99% ingot frt allwd. **COPPER**: (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. **LEAD**: common grade. **MAGNESIUM**: 99.8% pig. Velasco, Tex. **NICKEL**: Port Colbourne, anada. **ZINC**: prime western. **TIN**: see above; other primary prices, pg. 169.

Roll Turning—a Master's Art at BIRDSBORO



FINISHING SCHOOL for rolls at Birdsboro is the series of final machining operations performed to meet customer specifications. And no detail, down to the protective shipping crate, is left to chance.

Even though this man is only part of the large crew whose work has gone into this roll, he takes infinite care . . . for he knows that only the best possible craftsmanship will be accepted by his foreman. And it's the same in Birdsboro's research laboratories, as well as in the roll foundry. The results can be measured in your mill when you use Birdsboro's specialized family of steel, alloy iron, and alloy steel rolls, each member capable of meeting specific rolling requirements and taming temperamental hard-to-roll steels: IRON BASE ROLLS—Grainloy, Birdsboro Metal, Curoloy, Superloy, Super Curoloy; STEEL BASE ROLLS—Diamondite, Birdsboro Special, Birdsboro 30, 40, 50 and 75. Main office and plant: Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., District Office: Pittsburgh, Pa., Subsidiary: Engineering Supervision Co., 120 W. 42nd St., New York 36, N.Y.

R-20-57

BIRDSBORO
STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES (Metalworking and Extrusion) • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

NONFERROUS PRICES *(Effective April 16, 1957)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1890, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061-0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	42.7-44.4	57.6-61.1
12-14	43.4-44.8	58.4-62.7
24-26	46.4-46.9	68.7-73.1
36-38	54.8-55.4	91.5-94.9

Screw Machine Stock—2011-T-3

Size"	¼	⅝-⅜	¾-1	1¼-1½
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length" →	72	96	120	144
.019 gage	$1 352	$1 803	$2 254	$2 704
.024 gage	1 686	2 252	2 815	3 378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type ↓ Gage →	.250-3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	103.1
AZ31B Spec.		93.3	95.7	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor →	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks		87	

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13		51.36	54.32
Brass, 70/30	47.52	48.06	47.46	50.43
Brass, Low	50.20	50.74	50.14	53.01
Brass, R.L.	51.14	51.68	51.08	53.95
Brass, Naval	51.69		46.00	55.10
Muntz Metal	49.79		45.60	
Comm. Bz.	52.63	53.17	52.57	55.19
Mang. Bz.	55.43		49.53	
Phos. Bz. 5%	73.17		73.67	

Free Cutting Brass Rod $37.68

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $11.00-$12.10; alloy, $14.75; Plate, HR, commercially pure, $9.25-$9.75; alloy, $11.25. Wire, rolled and/or drawn, commercially pure, $8.50-$9.00; alloy, $11.00; Bar, HR or forged, commercially pure, $7.10-$7.35; alloy, $7.10-$7.30; billets, HR, commercially pure, $6.85-$7.10; alloy, $6.85-$7.05.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis ... $ 1.31
Cobalt, 97-99% (per lb) .... $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $48.50-$53.50
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz... $ 2.25
Iridium, dollars per troy oz.... $90 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz.. $23 to $24
Platinum, dollars per troy oz.... $92 to $95
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 31.50
No. 120 ..... 30.00
No. 123 ..... 28.50
80-10-10 ingot
No. 305 ..... 35.50
No. 315 ..... 33.50
88-10-2 ingot
No. 210 ..... 43.25
No. 215 ..... 40.00
No. 245 ..... 35.50
Yellow ingot
No. 405 ..... 25.25
Manganese bronze
No. 421 ..... 28.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.50-25.50
0.60 copper max. 24.25-25.25
Piston alloys (No. 122 type) .. 22.25-23.50
No. 12 alum. (No. 2 grade) ... 22.00-23.00
108 alloy 22.00-23.00
195 alloy 24.00-25.50
13 alloy (0.60 copper max.) ... 24.25-25.25
AXS-679 ..... 22.00-23.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 23.00-23.75
Grade 2—92-95% 21.50-22.00
Grade 3—90-92% 20.50-21.50
Grade 4—85-90% 19.75-20.75

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	28	27¼
Yellow brass	21⅞	20⅛
Red brass	25	24¼
Comm. bronze	25⅞	25⅛
Mang. bronze	20½	19¾
Yellow brass rod ends	21⅝	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¾
No. 2 copper wire 25¼
Light copper 23
*Refinery brass 24¼
Copper bearing material 23¾
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¾
No. 2 copper wire 25¼
Light copper 23
No. 1 composition 23½
No. 1 comp. turnings 23
Hvy. yellow brass solids 17
Brass pipe 19
Radiators 18

Aluminum

Mixed old cast ..... 13½—14
Mixed new clips ..... 15½—16
Mixed turnings, dry ..... 14½—15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 24 —24¼
No. 2 copper wire ..... 22½—23
Light copper ..... 20¾—21¼
Auto radiators (unsweated) .. 15¾—16
No. 1 composition ..... 21 —21½
No. 1 composition turnings... 20½—21
Cocks and faucets ..... 16½—17
Clean heavy yellow brass.... 14½—15
Brass pipe ..... 17 —17½
New soft brass clippings .... 19 —19½
No. 1 brass rod turnings .... 16¼—16½

Aluminum

Alum. pistons and struts .... 5½— 6
Aluminum crankcases ..... 10½—11
1100 (2S) aluminum clippings 13½—14
Old sheet and utensils ..... 10½—11
Borings and turnings ..... 6½— 7
Industrial castings ..... 10½—11
2024 (24S) clippings ..... 12 —12½

Zinc

New zinc clippings ..... 6½— 7
Old zinc ..... 4½— 5
Zinc routings ..... 2½— 2¾
Old die cast scrap ..... 2¼— 2½

Nickel and Monel

Pure nickel clippings ..... $1.15-$1.25
Clean nickel turnings ..... $1.10-$1.15
Nickel anodes ..... $1.15-$1.25
Nickel rod ends ..... $1.15-$1.25
New Monel clippings 50-55
Clean Monel turnings 45-50
Old sheet Monel 50-55
Nickel silver clippings, mixed. 21
Nickel silver turnings, mixed. 18

Lead

Soft scrap lead ..... 12 —12½
Battery plates (dry) ..... 6½— 6¾
Batteries, acid free ..... 3¾— 4

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 12 —12½
Solder joints ..... 17½—18
Siphon tops 42
Small foundry type ..... 14¼—14½
Monotype ..... 14 —14½
Lino. and stereotype ..... 13 —13½
Electrotype ..... 12½—12¾
Hand picked type shells ..... 9½—10
Lino. and stereo. dross ..... 4¾— 5
Electro. dross ..... 4 — 4¼

STEEL PRICES

(Effective April 16, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b., mill in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.85 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *N8*				
	Pawtucket, R. I. Worcester, Mass.									7.48 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.875 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3, T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1,W8* 5.00 *P13*	7.35 *U1,Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1, T8* 6.95 *M8*			7.75 *W8, S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5, J3*			7.75 *J3*	
	Detroit, Mich.			$107.00 *R5*					4.775 *G3, M2*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, D2*	7.75 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1, I3*	5.25 *I3*	4.675 *U1, I3,Y1*	6.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*				5.00 *N4*			4.775 *N4*					
	Indianapolis, Ind.									7.00 *C5*				
	Newport, Ky.												7.75 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1, C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1*	$91.50 *U1, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P6*	5.750 *P6* 6.85 *J3,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3,F3*	6.95 *W3*	9.65 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*			7.35 *Y1*			6.85 *Y1,C5*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.75 *K1*	8.10 *K1*	5.90 *K1*	5.525 *K1*	8.70 *K1*				
	Geneva, Utah		$91.50 *C7*			5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.05 *B2*		5.425 *B2, C7*	8.90 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.775 *C6*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.00 *B2*		5.425 *C7,B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.10 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.								4.875 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2,R3* 5.00 *C16*	7.35 *T2*		4.675 *T2,R3* 4.975 *C10* 4.675 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

Italic symbols produce steel listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES

(Effective April 16, 1957)

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvy.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25 lb. base box	Electro* 0.25 lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*			5.90 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*				$9.80 *U1*	$8.50 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*		5.90 *B3*	$9.80 *B3*	$8.50 *B3*	
	Worcester, Mass.										6.10 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*									
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*										
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*	5.80 *A5,R3, N4,W8, K2*			
	Sterling, Ill.										5.90 *N4, K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*			5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.85 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*						
	Newport, Ky.	4.675 *A9*	5.75 *A9*											
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*			5.80 *Y1*	$9.70 *U1, Y1*	$8.40 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*								$8.50 *G2*	7.25 *G2*
	Kokomo, Ind.			6.40 *C9*							5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*								
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3,N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*					$8.40 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*		5.80 *A5, P6,J3*	$9.70 *J3, U1*	$8.40 *U1, J3*	7.15 *U1, J3*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*								5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*				$9.70 *W5, W3*	$8.40 *W5, W3*	7.15 *W5* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*			5.80 *Y1*			
WEST	Fontana, Cal.	5.525 *K1*	7.00 *K1*				7.75 *K1*	9.775 *K1*				$10.45 *K1*	$9.15 *K1*	
	Geneva, Utah	4.775 *C7*												
	Kansas City, Mo.										6.05 *S2*			
	Los Angeles, Torrance, Cal.										6.60 *B2*			
	Minnequa, Colo.										6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*							6.60 *C7*	$10.15 *C7*	$9.15 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	.575 *T2*	6.30 *T2, R3*							5.80 *T2,R3*	$9.80 *T2*	$8.50 *T2*	
	Houston, Tex.										6.05 *S2*			

IRON AGE

STEEL PRICES

(Effective April 16, 1957)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforc-ing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.70 *C4*		6.85 *C4*	7.55 *C4*	
	Coatesville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.95 *A2*	5.925 *A2*	6.85 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn. Putnam, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.075 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Mass.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.625 *A5* 8.625 *B5*						7.50 *A5,W6* 9.025 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.40 *L1*
	Ashland, Newport, Ky.							4.85 *A7,A9*		6.85 *A9*		
	Canton, Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2, T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3, W8,N4* 5.075 *P13*	5.075 *U1,R3, N4* 5.075 *P13*	6.85 *A5,B5, W10,L2 W8,N9*	6.125 *U1,R3, W8*	8.325 *A5,B5, W8,L2,N9, W10*	5.875 *W8* 7.425 *U1*	4.85 *U1,I3, W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5,K2 R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1, Y1*	7.25 *U1, Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.175 *N4*	5.175 *N4*					4.85 *N4*				7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C10*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, J3,R3,S9, B4,W10,C11*	6.125 *U1, C11,J3*	8.325 *A5,R3, S9,C8,W10, C11*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1* 7.25 *U1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.60 *K1*		7.60 *K1*	8.00 *K1*	
	Geneva, Utah							4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3,P14*	7.175 *B2*	10.20 *P14*	8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7* 5.825 *B2* 6.025 *P9*	5.775 *C7* 5.825 *B2* 6.025 *P9*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2, N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.275 *A8*										7.10 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2,R3* 5.075 *C16*	5.075 *T2,R3* 5.075 *C16*	7.45 *C16*			7.425 *T2*	4.85 *T2,R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

† Merchant Quality—Specialty Quality .35¢ higher.

STEEL PRICES *(Effective April 16, 1957)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland.
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
H1 Hanna Furnace Corp., Detroit
I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland
J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.
K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.
L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.
O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland
P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.
S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston
U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham
W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B5*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Youngstown *R3*	9.25	+10.00	12.25	+6.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fontana *K1*	+3.75	+19.00	+0.75	+15.00	2.75	+10.50	5.25	+9.75	5.75	+8.75	6.25	+8.25	7.75	+8.50								
Pittsburgh *J3*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Alton, Ill. *L1*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Sharon *M3*	9.25	+10.00	12.25	+2.00	15.75	+1.50	18.25	0.25	18.75	1.25	19.25	1.75	20.75	2.50								
Fairless *N2*	7.25	+8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50								
Pittsburgh *N1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Wheeling *W5*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Wheatland *W4*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25								
Youngstown *Y1*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
Indiana Harbor *Y1*	8.25	+9.00	13.25	+2.00	14.75	1.50	17.25	2.25	17.75	3.25	18.25	3.75	19.75	4.25								
Lorain *N2*	9.25	+6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.75	5.25	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B5*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Youngstown *R3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Fairless *N2*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Fontana *K1*	0.75		4.75		7.75		8.25		8.75		9.25		9.75									
Pittsburgh *J3*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Alton, Ill. *L1*	11.75	+2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50								
Sharon *M3*	13.75	+4.00	17.75	list	20.75	4.50	21.25	4.25	21.75	5.25	22.25	5.75	22.75	5.50								
Pittsburgh *N1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Wheeling *W5*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Wheatland *W4*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50								
Youngstown *Y1*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50
Indiana Harbor *Y1*	12.75	+1.00	16.75	3.00	19.75	7.50	20.25	6.25	20.75	7.25	21.25	7.75	21.75	6.50								
Lorain *N2*	13.75	+2.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in. 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	2	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83 D-3, D-5
Oil hardened manganese	.45 O-2
Special carbon	.41 W-1
Extra carbon	.345 W-1
Regular carbon	.29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				35.50
	304	34.60	38.00	41.50	37.75
	316	39.70	43.20	46.65	55.50
	321	36.35	39.80	43.50	44.75
	347	39.50	43.95	48.45	54.25
	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (S9) Copper, 10 pct, 2 sides, 39.85; 1 side, 33.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.80	9.20	
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Motor	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (20¢ higher, HR); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181		195	187	8.10	8.50
Aliquippa, Pa. *J3****	164	179			181	8.20	8.875
Atlanta *A8***	166	182		192	190	8.05	8.65
Bartonville *K2***	166	182		198	190	8.30	9.06
Buffalo *W6*						8.20	8.75
Chicago, Ill. *N4***	164	180	167	196	188	8.35	9.10
Cleveland *A6*	173					8.20	8.75
Cleveland *A5*						8.20	
Crawfordsville *M4***	166	182		198	190	8.30	9.05
Donora, Pa. *A5*	164	176		196	184	8.20	8.75
Duluth *A5*	164	176	167	196	184	8.20	8.75
Fairfield, Ala. *T2*	164	176		196	184	8.20	8.75
Galveston *D4*	169‡						
Houston *S2*	169	181		195	189	8.45	9.00
Johnstown, Pa. *B3***	164	180	167		188	8.20	8.95
Joliet, Ill. *A5*	164	176		196	184	8.20	8.75
Kokomo, Ind. *C9**	166	178		198	186	8.30	8.85
Los Angeles *B2****						9.15	9.90
Kansas City *S2**	169	181		195	189	8.45	9.00
Minnequa *C6*†	169	181	172	195	189	8.45	9.00
Monessen *P6*	167	185			191	8.10	8.10
Palmer, Mass. *W6*						8.50	9.05
Pittsburg, Cal. *C7*	183	199		220	204	9.15	9.70
Rankin, Pa. *A5*	164	176			184	8.20	8.75
So. Chicago *R3*	167	181		195	187	8.10	8.50
S. San Francisco *C6*†				214		9.15	9.70
Sparrows Pt. *B3****	166			198	190	8.30	9.05
Struthers, O. *Y1**						8.20	8.85
Worcester *A5*	170					8.50	9.05
Williamsport, Pa. *S5*			175				

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only.
*** .10¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.20	10.40	12.60	15.60	18.55
Bristol, Conn. *W12*		10.40	12.60	15.60	18.55
Boston *T8*	9.20	10.40	12.60	15.60	18.55
Buffalo, N. Y. *R7*	8.65	10.10	12.30	15.30	18.25
Carnegie, Pa. *S9*	8.65	10.10	12.30	15.30	
Cleveland *A5*	8.65	10.10	12.30	15.30	18.25
Detroit *D1*	8.75	10.20	12.40	15.40	
Detroit *D2*	8.75	10.20	12.40		
Dover, O. *G4*	8.65	10.10	12.30	15.30	18.25
Evanston, Ill. *M8*	8.65	10.10	12.30		
Franklin Park, Ill. *T8*	8.75	10.10	12.30	15.30	18.25
Harrison, N. J. *C11*			12.60	15.60	18.55
Indianapolis *C5*	8.10	9.95	12.60	15.60	17.95
Los Angeles	10.85	12.30	14.50		
New Castle, Pa. *B4*	8.65	10.10	12.30	15.30	
New Haven, Conn. *D1*	9.10	10.40	12.60	15.60	
Pawtucket, R. I. *N7*	9.20	10.40	12.60	15.60	18.55
Pittsburgh *S7*	8.65	10.10	12.30	15.30	18.25
Riverdale, Ill. *A1*	8.75	10.10	12.30	15.30	18.25
Sharon, Pa. *S1*	8.65	10.10	12.30	15.30	18.25
Trenton *R4*	11.05	10.40	12.60	15.60	18.55
Wallingford *W1*	9.10	10.40	12.60	15.60	18.45
Warren, Ohio *T4*	8.65	10.10	12.30	15.30	18.25
Worcester, Mass. *A5*	9.20	10.40	12.60	15.60	18.55
Youngstown *C5*	7.95	9.80	12.60	15.00	17.95

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	36.34	42.56	33.21	
	2½	12	48.94	57.31	44.73	
	3	12	56.51	66.18	51.66	
	3½	11	65.97	77.25	60.30	
	4	10	87.61	102.59	80.07	
National Tube	2	13	36.34	42.56	33.21	
	2½	12	48.94	57.31	44.73	
	3	12	56.51	66.18	51.66	
	3½	11	65.97	77.25	60.30	
	4	10	87.61	102.59	80.07	
Pittsburgh Steel	2	13	36.34	42.56		
	2½	12	48.94	57.31		
	3	12	56.51	66.18		
	3½	11	65.97	77.25		
	4	10	87.61	102.59		

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Hot-Rolled (special quality)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.17	9.37	9.83	8.21	8.55	8.59	8.45		10.23				
Baltimore	$.10	7.79-7.98	8.99-9.08	9.12	8.27-8.46	8.12-8.36	8.57-8.85	8.34-8.53		9.09-9.23	14.99	14.44	18.39	18.09
Birmingham	.15	7.68-7.80	8.88-9.00	9.52	7.78-7.82	8.01-8.16	8.05-8.20	8.07	8.44	10.04-10.12				
Boston	.10	8.94	9.98	11.16	8.99	9.28	9.20	9.17	9.57		15.79	14.79	19.14	18.39
Buffalo	.15	8.00	9.15	10.90	8.20	8.65	8.65	8.40	8.85	8.85	15.65	14.65	19.01	18.25
Chicago	.15	7.95	9.15	9.85	7.97	8.31	8.35	8.22	8.44-8.59	8.50	15.30	14.30	18.65	17.90
Cincinnati	.15	8.09	9.20	9.90	8.29	8.67	8.89	8.53	8.87	8.99	15.61	14.61	18.96	18.21
Cleveland	.15	7.93	9.13	9.75	8.07	8.54	8.72	8.31	8.67	8.75	15.39	14.39	18.74	17.99
Denver		9.55	11.09	12.41	9.70	9.80	9.60	9.75		10.54				19.79
Detroit	.15	8.18	9.40	10.20	8.32	8.66	8.89	8.52	8.86	8.85	15.46	14.56	18.81	18.16
Houston		8.80	9.75		8.85	8.80	9.10	9.15		10.65	15.50		19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	8.73		9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.20	10.90	11.75	9.25	9.75	9.25	9.15	9.30	12.20	16.45	15.60	20.30	19.70
Memphis	.15	8.02	9.22		8.12	8.35	8.39	8.25		9.85				
Milwaukee	.15	8.08	9.28	9.98	8.10	9.75	8.56	8.35	8.71	8.72	15.43	14.43	18.78	18.03
New York	.10	8.55	9.76	10.33	9.00	9.11	9.01	9.11	9.48		15.02	14.69	18.42	18.29
Norfolk	.20	8.00			8.40	8.35	8.70	8.45		10.70				
Philadelphia	.10	8.25	9.17	10.39	8.92	8.78	8.80	8.81	9.18	9.41	15.61	14.61	18.96	18.21
Pittsburgh	.15	7.93	9.14	10.20	8.07	8.31	8.35	8.22	8.59	8.75	15.30	14.30	18.65	17.90
Portland		8.90	9.65	11.40	10.25-11.05	9.00	9.35	9.45		13.55	16.70	16.10	20.40	20.25
San Francisco	.10	9.05	10.40	10.90	9.05	9.30	9.15	9.15	9.90	12.40	16.45	15.60	20.30	19.70
Seattle		9.55	10.70	11.65	9.55	9.30	9.35	9.50	9.85	13.40	16.55	15.85	19.50	19.45
Spokane	.15	9.70	10.85	11.80	9.70	9.45	9.50	9.65	10.00	13.55		16.75		20.35
St. Louis	.15	8.29	9.49	10.21	8.34	8.67	8.82	8.58	8.96	9.11	15.66	14.66	19.01	18.26
St. Paul	.15	8.29	9.64	10.31	8.39-8.58	8.71-9.05	8.75-9.09	8.52		9.21		14.62		18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

† 16 gage. †† 13½¢ zinc. ‡ Deduct for country delivery.

(Effective April 16, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.275	6.25	6.60				
So. Chicago *R3*				9.225			
Enaley *T2*	5.275	6.25					
Fairfield *T2*		6.25		9.225		6.275	
Gary *U1*	5.275					6.275	
Huntington *C6*		6.25					
Ind. Harbor *I3*	5.275		6.60	9.225		6.275	
Ind. Harbor *Y1*				9.225			
Johnstown *B3*		6.25					
Joliet *U1*			6.60				
Kansas City *S2*				9.225			13.85
Lackawanna *B3*	5.275	6.25	6.60			6.275	
Lebanon *B3*							13.85
Minnequa *C6*	5.275	6.75	6.60	9.225		6.275	13.85
Pittsburgh *P5*							13.85
Pittsburgh *J3*				9.225			
Seattle *B2*				9.725		6.425	13.16
Steelton *B3*	5.275		6.60			6.275	13.85
Struthers *Y1*				9.225			
Torrance *C7*						6.425	
Williamsport *S5*		6.15					
Youngstown *R3*				9.225			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $15.00 to $15.75
Foundry, beehive (f.o.b. oven)
$17.50 to $19.00

Foundry oven coke

Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100, 110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 49.42
Electrodeposited 39.25
Brass, 80-20, ball anodes, 2000 lb or more 50.00
Zinc, ball anodes, 2000 lb lots 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb $1.0225
(Rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical $1.07 per in.

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum 76.00
Copper sulphate, 100 lb bags, per cwt. 24.35
Nickel salts, single, 100 lb bags ... 40.50
Nickel chloride, freight allowed, 300 lb 45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums 23.05
(Philadelphia price 23.30)
Zinc cyanide, 100 to 900 lb 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100-499 lb drums 31.75

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	52½	56½	58½	59½
⅝" thru 1" x longer than 6"	43½	47½	50	51½
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	52½	56½	58½	59½
Lag, all diam. x 6" & shorter	52½	56	58	59
Lag, all diam. longer than 6 in.	44½	48	50	51
Plow bolts, ½" and smaller x 6" and shorter	52	55½	57	58

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.

	Full Case or Keg Price
⅝ in. or smaller	61½
⅞ in. to 1 in. inclusive	57½
1⅛ in. to 1½ in. inclusive	62½
1⅝ in. and larger	56

C. P. Hex reg. & hvy.

¾ in. and smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

Hot Galv. Nuts (All Types)

¾ in. and smaller 48

Semi-finished Hex Nuts

¾ in. or smaller	61½
⅞ in. to 1½ in. inclusive	57½
1⅝ in. and larger	56

(Add 25 pct for broken case or keg quantities)

Finished

1 in. and smaller 64

Rivets

Base per 100 lb
½ in. and larger $11.50
Pct Off List
7/16 in. and smaller 23

Cap Screws

Discount (Packages)
Bright Treated H. C. Heat

New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	44	31
¾", ⅞" and 1" diam. x 6" and shorter	27	9
⅝" diam. and smaller x longer than 6"	14	+ 6
¾", ⅞" and 1" diam. & longer than 6"	½	+24

C-1018 Steel

	Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	44	61
¾" through 1" dia. x 6" and shorter	27	49

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish		Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk	*Quantity*		
To ¾" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

		Discount Hex	Square
In cartons		16	19
	Quantity		
In Bulk ⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.7
Chicago	134.1
San Francisco-L. A.	141.8

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standards chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard, Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags	8.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 99.8+% Fe	86.0¢ to $1.55
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	49.75¢
Copper, reduced	49.75¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese f.o.b. Exton, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed −80	$1.13
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.00 (nominal)
Zinc, 10 ton lots	18.75¢ to 32.50¢

GREATER FLEXIBILITY IN WIRE STRAIGHTENING AND CUTTING WITH VARIABLE SPEED DRIVE

. . . in a low cost machine

- Select-O-Speed Drive permits selection of infinitely variable feed speeds from 25 to 155 FPM for all types of wire and rod.
- Available with super-sensitive electric trip mechanism.
- High-Speed Five-Die Straightener Arbor, mounted on ball bearings.
- Lewis engineered, simple, rigid, dependable . . . of best materials and workmanship.
- Ideal for manufacturers of stove and refrigerator racks, lamp shades, wire baskets, garment hangers, welding rod and other products where small diameter wire is used.

Lewis 1-C Automatic Wire Straightening and Cutting Machine. 1/16" to 1/8" capacity.

For further information write:

THE LEWIS MACHINE COMPANY

3441 EAST 76TH STREET • CLEVELAND 27, OHIO

PICKLING TANK TEST in 3 minutes with FERRO PICKLE PILLS

Any workman who can tell red from green and count to ten can test the exact strength of pickling solutions . . . *the exact percentage of iron content*, and the solution percentage of sulphuric acid, muriatic acid, alkali etc. in metal cleaning tanks.

Ferro Pickle Pills provide a quick, accurate test to augment periodic titration testing, or as a "test within a test". They can assure full-capacity cleaning with fewer rejects, save money by eliminating premature dumping of tanks. That's why more and more companies are using them. Why don't *you* try them? Write today for literature and prices.

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Supplies Division

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Now . . . a new principle . . . a new approach to rapid

DEBURRING and CHAMFERING of inside and outside diameters

NOBUROD and NOBURSINK *High Production Partners!*

Companion tools – NOBURSINK for openly accessible hole faces and NOBUROD for outer ends of rods, tubes and bosses – provide greatly improved work quality, faster and easier than ever before. Both have low torque design permitting rapid, off-hand workpiece handling without chatter – even on large diameters. Unique design allows regrinding without special tools.

Eliminate makeshift and less efficient tools

Both NOBURSINK and NOBUROD tools work equally well on all metals. Cutting chips are freely expelled from the work area. Each tool accommodates a wide range of work size – and are furnished 90° included angle (produces 45° chamfer).

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NO/BUR TOOLS NOBUR MANUFACTURING CO.

6860 Farmdale Ave., No. Hollywood, California

FERROALLOY PRICES

(Effective April 16, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C	41.50	0.20% C	38.50
0.03% C	41.00	0.50% C	38.25
0.06% C	39.50	1.00% C	37.50
0.10% C	39.00	1.50% C	37.35
0.15% C	38.75	2.00% C	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si .. 35.50
8.50% max. C, 50-55% Cr, 3-6% Si .. 24.00
8.50% C, 50-55% Cr, 3% max. Si... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ¼ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.30
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
S. Duquesne	12.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 25.50

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% mn	$37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.25	37.15	38.35
0.15% max. C	33.60	36.40	37.40
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si....	31.60	31.40	32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	14.10
Ton lots, packed	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe	23.70	22.40
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	13.00	75% Si	16.80
65% Si	15.65	85% Si	18.50
	90% Si	19.90	

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.30
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Alsifer, 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 42.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$5.10
Less ton lots	5.15

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb. contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down, packed, per pounds contained W, ton lots delivered ..... $2.95 (nominal)

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.33

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract, basis, per pound contained V_2O_5 ..... $1.38

Zirconium contract basis, per lb of alloy
35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortam, f.o.b. Niagara Falls,

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.... 1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over

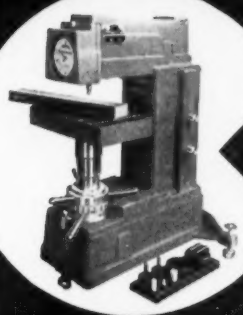
No. 1	$1.05
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.15

2
Applications
(REGULAR AND SUPERFICIAL)
1
Tester



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Hundreds of installations over the past few years have proved the economy of the only hardness tester which combines all scales of Rockwell Test (15 to 150 kg. loads).
The Kentrall cuts costs because it does the job of two conventional testers, requires only half the space and maintenance. Write for more detailed information, plus a list of prominent users who have switched to Kentrall. TB148

PRICE $680.

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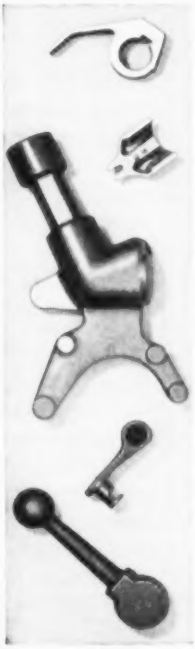

More and more cost-conscious buyers of metal parts are turning to lighter, stronger Ritco Forgings. Here's why...

MINIMUM MACHINING! Made to close-tolerance specifications, Ritco Forgings are highly accurate and require a minimum of machining . . . save hours of time and labor . . . keep production costs *down.*

MAXIMUM STRENGTH! Because their dense, fibrous structure and controlled grain flow add greater strength and toughness to points of shock and stress, Ritco Forgings provide maximum impact resistance and fatigue strength.

FASTER ASSEMBLY! Flawlessly finished Ritco Forgings are free of flash, voids and blow holes . . . have smooth, accurate surfaces which speed up assembly, help reduce costs. Depending on your design requirements, Ritco Forgings can be produced in weights from ¼ to 15 lbs. in a wide range of metals and alloys.

Write Ritco into your plans . . . send blueprints for estimates!

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"ANYTHING containing IRON or STEEL"

Chicago Confident Of Good Quarter

Used machinery business, despite mild slowdown, continues at high level.

Automotive slowdown hasn't hurt and West Coast buyers are active in the area.

▪ Midwestern used tool dealers report a very mild slowdown in April, but generally the volume of used tool sales continues at a high level. Inquiries have dropped, some firms report, but a number of dealers expect that second quarter operations will equal first quarter. In a few situations, they will exceed the high first quarter levels.

One clue to the business outlook is pricing. Chicago dealers are paying stiff prices in the East, and in the past two weeks there have been indications that used tool prices are strengthening, rather than getting weaker.

No Auto Aftereffects—The Detroit automotive slowdown in March seems to have had little local effect. Even automotive component manufacturers are holding a fairly hot pace in their buying rate. They are demanding late model tools, but this is certainly nothing new. What's more important, they seem to be willing to pay the rather stiff pricing required for late model equipment.

Business coming in from the West Coast spurted mildly as Western buyers hit town with some money and seemed anxious to use it. Particularly sought were late model screw machines and heavy equipment for sheet metal working, though this material had to be in fairly new models. Sheet metal equipment generally has been strong among Midwestern customers, though large punch presses slowed for a time last month and are still not moving as strongly as they did through January and February.

Tool Room Sales Hold—Vertical turret lathes, milling machines, lathes, radial drills and boring mills are in strong demand, both in the local market and for out-of-area shipment. A strong movement of these to out-of-area markets seems to have tightened the local supply of this equipment even more than was the case in January, and may be one factor in the inching price rise that began in March.

Tool room equipment, an indicator of trouble ahead when it begins to slump before big production equipment shows any signs of weakness, is at least holding March levels. If there is any cause for concern in the second-quarter business outlook, it may be in the fact that a few smaller dealers report they are beginning to detect a mild slide in toolroom equipment demand. The fact remains, the slip is extremely small and most used tool dealers feel that at this stage it can hardly be called a trend.

Inventories Mighty Low — Main trouble continues to be dealer inventories. It's been very difficult to prevent a build-up, on the dealer's show room floor, of older model tools and there's a steady decline in the amount of newer equipment he has to show. This problem seems to be getting worse, as late model tool prices continue to advance at a sharper rate than on old models, and as cash for inventory purposes becomes even more difficult to obtain.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
6' x 3/16" Niagara Initial Type
10' x 1/2" Kling Pyramid Type
BRAKES—LEAF TYPE
8' x 3/16" Dreis & Krump
12' x 1/4" Dreis & Krump
BRAKES—PRESS TYPE
6' x 12 Ga. Dreis & Krump
12' x 16 Ga. Dreis & Krump
12' x 5/16" Cincinnati—NEW
CRANES—OVERHEAD ELECTRIC TRAVELING
3 ton P&H 56' Span 220/3/60
5 ton Whiting 48' Span 230/3/60 A.C.
5 ton Shaw 56' Span 230 Volt D.C.
8 ton P&H 55' Span 220/3/60
10 ton P&H 38' Span 230 Volt D.C.
15 ton Shepard Nile 52' Span 230 Volt D.C.
25 ton Cleveland 70' Span 230/3/60 A.C.
With 10 ton Auxiliary
CRANE TROLLEY
10 ton P&H Type HMR Crane Trolley. Motors 440/3/60, Magnetorque Contractor, Panel and Electric Brake, NEW
DIEING MACHINE
60 ton Henry & Wright, Roll Feed, Scrap Cutter 4" Stroke NEW 1950
DRAW BENCH
10,000# Aetna Standard, Length of Draw 41', Used to draw S.A.E. 1035 Welded Steel Tubing
FORGING MACHINES
1" to 5" Acme, Ajax, National
3" Acme Model XN, Air Clutch, NEW 1951
HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb to 20,000 lb.
LEVELERS—ROLLER
37" Torrington, 17 Rolls 1-31/32" Dia. Backed up
48" Aetna Standard, 17 Rolls 3¾" Dia.
54" McKay, 17 Rolls, 3⅜" Dia.
108" American, 17 Rolls, 4½" Dia.
PLANER—Crane & Duc
35" Southwark Pneumatic Holddown, Motor Driven, Capacity 1½"
PRESSES—HYDRAULIC
200 ton Bliss Hydro Dynamic, 36" Stroke Bed Area 30" x 31"
2800 ton Bliss Hydro Dynamic, 12" Stroke, 60-15/16" Between Columns
4500 Baldwin-Lima-Hamilton Hydr. Forging Press
PRESSES—STRAIGHT SIDE
Clearing F-1300-42, 300 ton, 24" Stroke, Bed 44 x 36"
Bliss #1018 Toggle Drawing 1550 ton, Strokes 24" and 12", Die Space 60" x 72"
PRESSES—TRIMMING
#56 Bliss Cons., 5" Stroke, 26" Bet. Ups
#2315 Bliss 3" Stroke, 18" Bet. Ups
#2761/2 Bliss 4" Stroke, 27" Bet. Ups
PUNCH & SHEAR COMBINATIONS
Cleveland Style EF Single End, 42" Throat
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1½" Buffalo Universal Ironworker
ROLL—FORMING
11 Stand Dahlstrom Roll Forming Mach. With Flying Pre-North Press & Flying Shear. Will take widths up to 8"
24 Stand Tishken Model L-M-1, Spindle Dia. 1½" 6½" Between Spindles, 3½" Capacity.
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6" x 5" Torrington Wire Flattening Mill Line
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12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
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26" x 72" Cold Rolling Mill
44" x 144" Three High Sheet Mill
22" x 40" Three High Sheet Mill
SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"
SHEAR—BAR
No. 12 Buffalo Armor Plate
Capacity 5" to 15" Beams & Channels
SHEARS—SQUARING
6' x 10" Ga. Niagara No. 672
10' x 14 Ga. Niagara
10' x 10 Ga. Niagara
8' x 1/4" Niagara—NEW 1952
12" x 1/2" Cincinnati
SLITTERS
25" Blake & Johnson
36" Wean Slitting Line
36" Paxson Slitting Line
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Kane & Roach Type B Capy. 7/8" Hex. Flat 4" x 11/32" Flat & Edge 1 7/8" x 3/16"
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Torbyn Fen. Capacity 2¼" Tube 3¾" Solid 10" Die Length Hydraulic Feed. LATE
TESTING MACHINES
20,000# Baldwin Universal Hydraulic
60,000, 100,000, 200,000 Olsen & Riehle Universal
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(1)—720-850-KW Whse. M-G Set, 600-710 VDC, Diff. Comp driven by a synchronous motor 900 R.P.M., 4000/2300-volt, 3 phase, 60 cycle.
(1)—Starting panel for syn. motor
(1)—4 unit exciter set
(1)—Set of variable voltage control

IDEAL REEL DRIVES

(2)—600-HP Allis-Chalmers mill motors, 600-VDC, 300/600 R. P. M., with a 1200-KW, 600-VDC Westinghouse M-G Set, 1750-HP synchronous motor, 4160/2300-Volt, 3 phase, 60 cycle.

(2)—275-HP Westinghouse mill type motors, 230-Volt, 425/850 R.P.M., with 2 or 3-unit, 600-KW M-G Set, 250-VDC and 900-HP synchronous motor, 2300-Volt, 3 phase, 60 cycle.

(2)—100-HP Electro-Dynamic motors, 230-VDC, 450/1350 R.P.M., with 3-unit, 300-KW Allis-Chalmers M-G Set, 2300/440-Volt, 3 phase, 60 cycle.

SPECIAL

(2)—600-HP Westinghouse mill motors, 230-VDC, 110/220 R.P.M., anti-friction pedestal bearings.

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Qu.	KW	Make	RPM	DC Volts	AC Volts
1	1500	G.E.	514	250	4000/2300
2	1000	Whse.	720	250	2300
2	500	Whse.	1200	125/250	2200
1	200	G.E.	1200	250/275	2300
1	300 (3-unit)	Al. Ch.	1200	250/300	2300
3	200	Whse.	1200	125/250	2300
2	150	Rel.	1200	125	2200
2	150	Whse.	1200	125/250	2300
1	150	G.E.	1200	250	4600/2300
1	100	Al. Ch.	1200	250	4600/2300
1	100	Whse.	720	125/250	2200
1	75	Whse.	1200	125/250	2200

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- 2" Wallace Hydraulic Pipe Bender
- 6' Carlton Radial Drill, 17" column
- No. 7 Ajax Forging Press, 700-ton capacity
- 3—2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress
- 25 Transformer and Generating Arc Welders
- 2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944
- 3000 lb. Model J-2 Chambersburg Board Drop Hammer, Motor driven head
- 1000 lb. Model J-2 Chambersburg Board Drop Hammer, Motor driven head
- 4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch, also 1", 2", 3" air clutch
- Williams White Bulldozers from 5-ton to 300-ton
- Landis Landmaco and other Landis Threading Machines
- Single & Double End Punches
- No. 3 Motch & Merryweather Saw, with Saw Grinder

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GUARANTEED
ELECTRIC POWER EQUIPMENT
DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
3	1375	G.E.	MCF	415	1300
1	1000	G.E.	MCF	600	350/500
1	500	Whse.	QM	230	450/470
1	800	Whse.		230	250/350
	with United Gear Set 7:1 Ratio				
1	500	Whse.	CC-216	600	300/900
3	450	Whse.		550	415
2	300	G.E.	MPC	230	400
1	250	G.E.	MPC	230	400/600
1	200	Whse.	CB-5413	250	400/800
2	200	Whse.	CB-207.4	250	850/1200
1	150	G.E.	CD B.B.	600	250/700
1	150	Cr.Wh.	65-H	230	1150
2	125	Whse.	SK-185	230	350/1050
1	125	Whse.	SK-183	230	850
2	100	Whse.	SK-181	230	450/1000
1	60-100	G.E.	RF-17	230	450/900
2	75	Cr.Wh.	5JH TEFC	230	860
1	50	G.E.	MD-412-AE	230	550
6	40	Rel.	385F TEFC BB	230	500/1500
2	30/40	Whse.	SK-131.5-BB DP	230	500/1500

MG SETS — 3 Ph. 60 Cy.

Qu.	KW	Make	RPM	DC Volts	AC Volts
2	2000/2400	G.E.	450	250/300	2300/4600
1	2000	G.E.	500		
			25 cy.	660	11000
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
3	1000	G.E.	720	600	6600/13200
2	1000	G.E.	514	600	6600/13200
1	750	G.E.	720	125/250	2300/4600
1	500	G.E.	900	540/540	4150
1	500	Whse.	900	125/250	440
2	300	G.E.	1200	250	2300
2	300	Whse.	1200	275	440/2800
1	200	Whse.	1200	550	2300

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3000	A.C.	OISC	3	33000 x 2300
1	1500	G.E. auto	HT	3	4000/4200/4400
3	1000	G.E.	HVDDJ	1	2400 x 480
3	1000	G.E.	OA/FA	1	13800 x 230/460
1	833	G.E.	H	1	13800 x 460
2	750	G.E.	Pyranol	1	4800 x 85/55
3	500	Kuhl.	OISC	3	13200 x 6600
1	500	G.E.	OISC	1	13200 x 2300
1	500	G.E.	HS	1	13800 x 600
1	300	G.E.	HT	3	4160 x 480/277
3	250	L.M.	OISC	1	13800 x 240/120
1	200	G.E.	Air-Cooled	3	432/480 x 120/208Y
3	150	G.E.	OISC		23000 x 2300/4000Y

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30 HP Master Gearmotor 56 RPM Exp Prf Sterns Magnetic Brake. 220/440/3/60.
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1—BONNOT BILLETEER, size "A", cap. 3" to 6" Squares.
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1—PELS BILLET AND BAR SHEAR, cap. 7" round, 50 HP motor.
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1—1200 HP GEAR DRIVE, 353 to 94.6 RPM, 3.73 to 1 ratio.
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1—1200 HP MOTOR, 2200 volts, 3 phase, 60 cycle, 353 RPM.
1—MC-30 WEST. MOTOR, 230 V. D.C. back axle brackets and shaft.
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HAMMERS
No. 3C Chambersburg pneumatic, serial No. 2297.
No. 6-1 Nazel, pneumatic, late.
No. 6B Nazel, self-contained.

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No. 3 Gisholt Univ. Turret Lathe (2), 1942.
No. 5 Gisholt ram type Univ. Turret Lathe, 1940.
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126" x 96" CC Niles Bement Pond engine lathe, 80 HP, M.D.

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No. 5-48 Cincinnati hydromatic duplex mill, serial 1B51D1K-5.
No. 2-24 Cincinnati automatic simplex mill, serial No. 1B3P1T-1.

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200 ton No. 7-72 Bliss S.S. D.C. Press Air Clutch.
350 ton Elmes self-cont. 4-post Hydraulic Press, 1944.
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1½" National Upsetter, guided ram, hard ways.
3" Ajax upsetting & forging machine, air clutch, serial 3614.
3" National high duty forging machine, serial 14195.
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4" National high duty, susp. & guided rams.
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3500 KW Allis 250-700 v.—13800/6900, 3/60
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52" Betts Car Wheel Borer
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12" Rockford Universal Hydraulic, flanged m.d.
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16" Hendey, m.d.
16" Smith & Mills Universal, m.d.
24" Hendey Back Geared Crank Shaper, m.d.
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32" Morton Draw-Cut, m.d., late
32" Ohio Shaper, m.d.
32" Cincinnati, m.d., late
32" Columbia H.D. Plain Back Geared Crank Shaper, m.d.
36" Morton Draw-Cut, m.d., late
36" Rockford Universal Openside Shaper-Planer, m.d.
38" Morton Push Cut Shaper, m.d.

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No. 1 Haskins, pneumatic control, type 1 CAP
No. 2 Haskins, pneumatic control, type 2 CAP
No. 3 Haskins, pneumatic control, type 3 CAP
Acme Semi-Automatic 6 spindle, 1½", arranged for m.d.
No. 3C Haskins, pneumatic control, type 3 CAM, m.d.
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AT SACRIFICE PRICES!

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1—INGERSOLL RAND CAMERON Centrifugal Pump & Motor, Model No. E3-EV, Serial No. A433286, with 100 HP Induction Motor; Model 17470, 3 phase, 60 cycle, 440 volts, 1755 RPM. Pump: GPM, 450, 1750 RPM, 462' Head, including 100 HP. Electrical: GE Automatic Compensator CR-7051 K1, 3 phase, 60 cycle, 440 volts. Year Mfg. 1943.
1—INGERSOLL RAND CAMERON Pump & Motor, Size 4HMT-4, Serial No. 01443518, 100 HP G.E. Motor, 440 Volts, Type KT-114A, #5168695, Form EL, 40 degrees, Model 17470. Pump: 450 GPM, 539' Head, Hydro Test 1200, 1750 RPM. Electrical: G.E. Automatic Compensator CR-7051 K1, 3 phase, 60 cycle, 440 v.
1—INGERSOLL RAND CAMERON Single Stage Suction Centrifugal Pump, Size 4RT-4, Serial No. 04523068, 200 HP Reliance Motor, 3550 RPM, 440 volts, Form 0, #71344A1, 239A—Code G, Frame A-50586, 40 degrees. Pump: 450 GPM, 3560 RPM, 1100' Head, 1200 Hydro Test, Year Mfg. 1952. Electrical: G.E. 151-200 HP Automatic Compensator, 3 phase, 60 cycle, 440 volt, CR-7051, Dif. with Enclosure 8B max. Amps 600.
1—WORTHINGTON Pump, Style 5KF365DA7, Serial No. 1038687, Size 1¾ x 4, 30 GPM, 1200 lb. capacity 25 HP G.E. Motor #5334, 1760 RPM, TEPC 220/440, 260 RPM, #5584203, Type KF, Model 14W168M44, Year Mfg. 1941.
1—ALLIS CHALMERS Centrifugal Pump, 3 or 4 Stage, 4" inlet, 3" outlet, 500 lb. pressure, 150 GPM new element, unit direct coupled to 75 HP Crocker Wheeler totally enclosed fan cooled Motor for 3/60/220, 3600 RPM, mounted on base, with Skidmore primer, equipped with Cutler-Hammer Bullet #9105, 75 HP Cross-The-Line Starter.
1—ALLEN SHERMAN HOFF Hydro Seal Pump, Style 5K326B7C, Serial No. HW18997, 15 HP G.E. Motor, 220/440 volts, 1750 RPM, Year Mfg. 1941.

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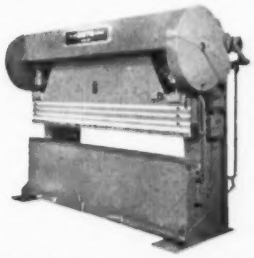

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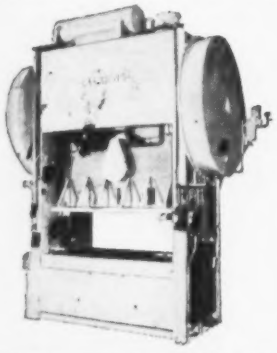

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Senate Plans Steel Price Study

Sen. Kefauver (D-Tenn.) pointed to a speech of Roger M. Blough, chairman of U. S. Steel Corp., as he revealed the Senate Anti-Monopoly Sub-committee is readying a report on economic concentration by industry. Blough had foreseen a "new business concept, giant corporations joining to form large combines for spreading their risks . . ." The Senate Subcommittee is also preparing material for hearings on the problem of price increases in the "administrated price" industries. Kefauver identified the steel industry as an example of these.

S-P Will Introduce $2000 Car

Studebaker-Packard will produce a low priced car designed to sell for less than $2000. The car will be introduced by fall. It will be offered in two and four-door models. Announcement was made by Roy T. Hurley, chairman of Curtiss-Wright, which has a management contract with S-P.

Strike at Woodward Iron Ends

Full production by the end of this week is expected by Woodward Iron Co., Birmingham, following settlement of its 162-day strike. Woodward and the AFL-CIO signed a new three-year contract ending the long deadlock on April 11.

J&L Shuts Down Five Openhearths

Jones & Laughlin Steel Corp. has shut down five of the openhearths at its Pittsburgh Works because of the decline in steel demand. The company is still operating at near-capacity operations, however, due to production rates of over 100 pct at Aliquippa, Pa. and Cleveland plants.

Strike-Idled Worker Benefits OK'd

More than 15,000 employees of U. S. Steel's Coal & Iron Div. at Birmingham can receive unemployment compensation for the time they were idled by strikes during 1955 and 1956, according to a circuit court ruling. Union officials say total of such benefit payments will be around $2 million.

Kaiser Awards Coke Oven Contract

Kaiser Steel Corp. has awarded a contract to the Koppers Co. to design and build two new coke-oven batteries and make extensions to an existing coal chemical plant at the firm's Fontana, Calif. plant.

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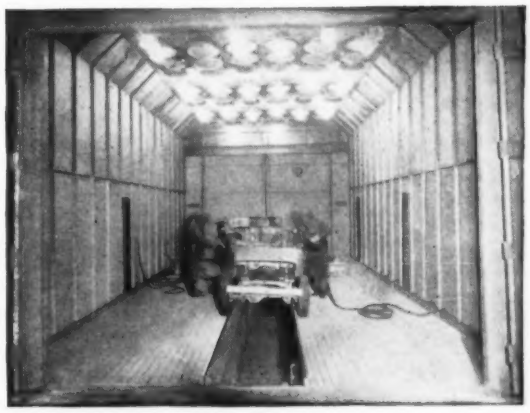

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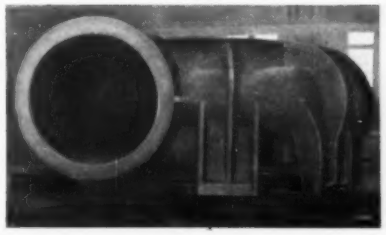

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"Our equipment has to produce — so we got PANGBORN BLASTMASTERS"

says Mr. W. BLACKMER, Foundry Superintendent,
Muskegon Piston Ring Company, Sparta, Michigan

4 Blastmaster® Barrels replace 6 air blast barrels and 10 tumbling mills . . . cut two and three shifts a day to just one

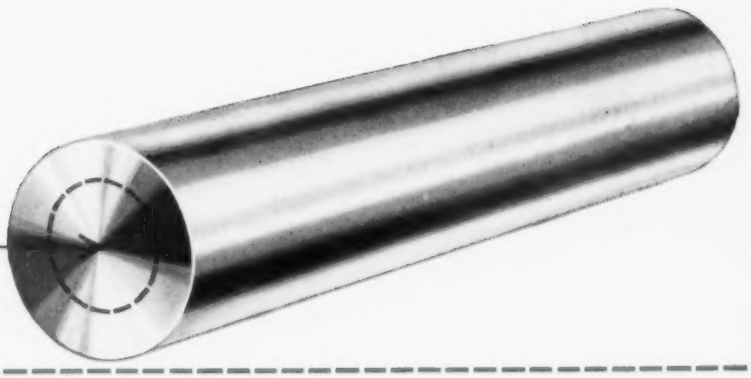
"We maintain over 4,000,000 finished castings in stock for immediate shipment. To keep this stock replenished, our blast cleaning equipment has to really turn out the work. And we want a good job, too! We have found that our Pangborn Blastmasters fill the bill on both points—production per manhour is amazing."

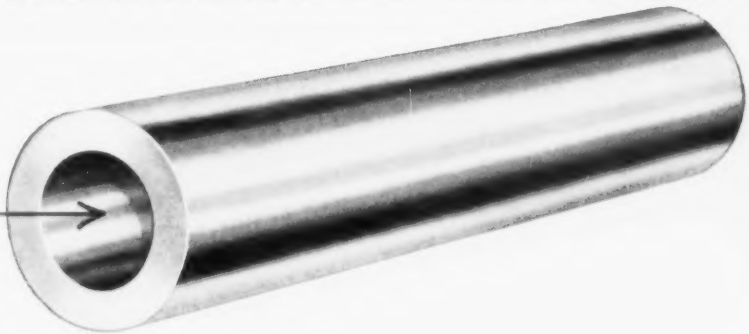
If *you* need blast cleaning equipment, look at all makes. Then check the Pangborn Blastmaster. You'll find it offers many exclusive features plus a choice of sizes to fit your needs—1½, 3, 6, 12, 18 and 27 cu. ft. Write for Bulletin 703 to PANGBORN CORP., 1500 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment.*

Pangborn blast cleans cheaper

Buying bar stock for hollow parts?

Why pay for all this steel





When you can start with this?

Buy TIMKEN® seamless steel tubing

If you're making hollow parts, and bore cut *solid* bar stock, you're paying for steel you don't use. But Timken® seamless steel tubing comes with *the hole already there.* You pay only for steel you use. On top of this saving, you cut machining costs. By eliminating that unnecessary boring operation, you free part of your screw machines for other jobs—add machining capacity without adding machines.

Our engineers will be glad to recommend the most economical tube size for your hollow parts job. By studying your problem and making recommendations, they'll save you money—and the Timken seamless steel tubing they suggest will be guaranteed to clean up to your finished dimensions.

The piercing process by which Timken seamless steel tubing is made is basically a forging operation. You get *fine forged quality*—a uniform spiral grain flow for greater strength, and a refined grain structure. And through our rigid quality control uniform quality is maintained from tube to tube, heat to heat and order to order.

The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

TRADE-MARK REG. U.S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING